

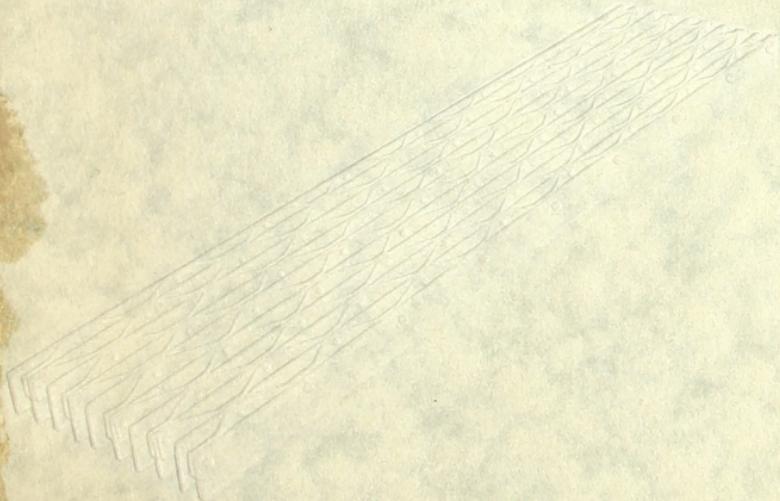
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MAY 1 1924

IRVING SUBWAY TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

IRVING SAFSTEP TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS



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IRVING (PATENTED) **SUBWAY**

TRADE MARK
REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

For every engineering, industrial, marine, architectural, or other purpose, where the advantages of a fire-proof metallic flooring are sought, in combination with maximum lighting and ventilating capacity and minimum weight.

IRVING (PATENTED) **SAFSTEP**

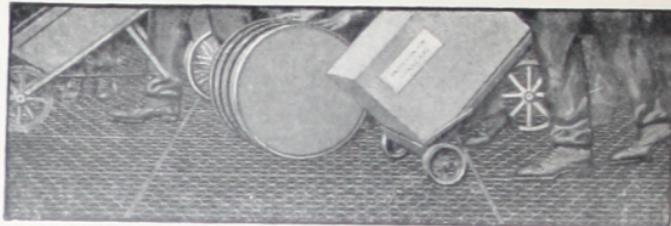
TRADE MARK
REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS

For every service where a permanently non-slipping, safe, light, durable, self-contained step is needed—for ladders or stairs—for indoor or outdoor use—for any duty whatever.

Catalog 4A

Copyright 1923

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.
DISTRICT SALES REPRESENTATIVE
R. F. BALDWIN
608 CHESTNUT STREET
PHILADELPHIA, PA.



PRESRIPT

Irving Subway is the first and only grating ever *manufactured*. Other gratings are built. Here's the big difference.

The *building* of grating means: occasional purchase of materials in small quantities; slow, cut-and-try, hand methods; varying quality; high cost; slow deliveries; no real service.

The *manufacture* of grating means: quantity purchase of materials, standardized machine methods; skilled and experienced supervision; uniform high quality; low cost; delivery on time; *real service*.

Moreover—

Irving Subway is the first open flooring ever known. Before this, the word "floor" meant something *solid*, to walk, work or wheel upon.

Now, it has an additional meaning, viz., **Irving Subway**—the open steel floor—the ventilating, lighting floor—the grating floor—the non-slipping floor—the floor with the truss element—the grating floor over which one may walk or work or wheel in any direction, as easily and comfortably as on the best solid floor.

And, in addition—

Irving Subway has all the advantages listed on pages 12 and 13 following.



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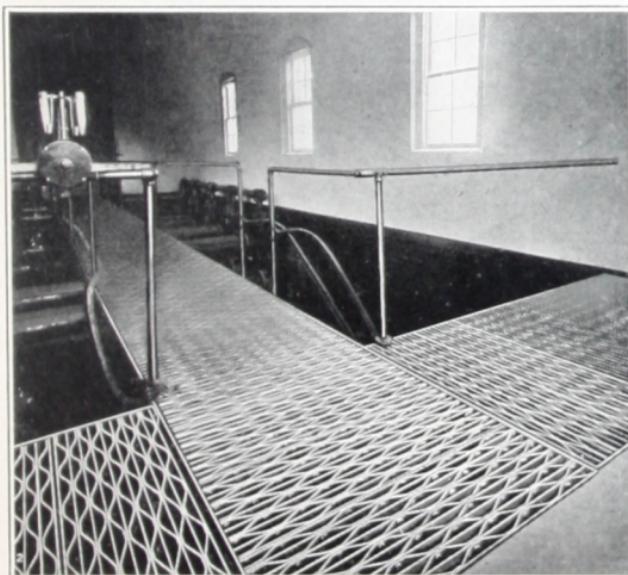
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A Word About Industrial Floors

Until quite recently, a floor was just something to stand upon or walk upon or work upon or wheel upon—and it mattered little what else it was, so long as it was reasonably smooth.

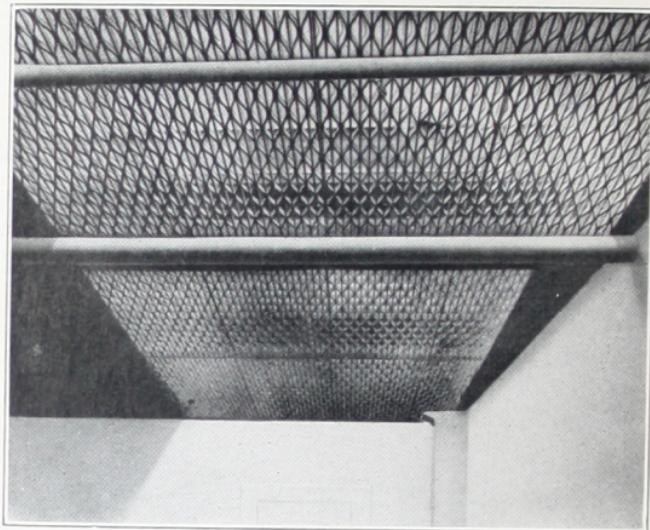
But, today, the floor of an industrial plant is recognized as a part of the plant equipment—an essential part—an economic factor in plant management and operation.

The development of "efficiency methods" called for better industrial floors—and, one by one, essential qualities were added, as betterment proceeded.



A safe, comfortable walkway of **Irving Subway**, with plenty of light and air beneath.

Irving Iron Works Co., Long Island City, N. Y.



See the flood of light admitted by the **Irving Subway** overhead. Think of the generous ventilation afforded.

For years, it was recognized that an "open floor"—one permitting light and air to pass through it—would be highly advantageous in many, many cases. But, because such a floor—possessing other good qualities in addition—was unknown, solid floors had to satisfy.

Actually, the floor of a plant is a part of the plant transportation system—upon which production is carried on, and over which men and materials and finished products move.

And this new conception of a floor as part and parcel of plant equipment, has brought new conceptions of floor values, new ideas of floor qualities—such as smoothness, cleanliness, safety, traction, ventilation, comfort, fire-proof-ness, durability, up-keep cost, installation cost, adaptability, silence, shock-resistance.

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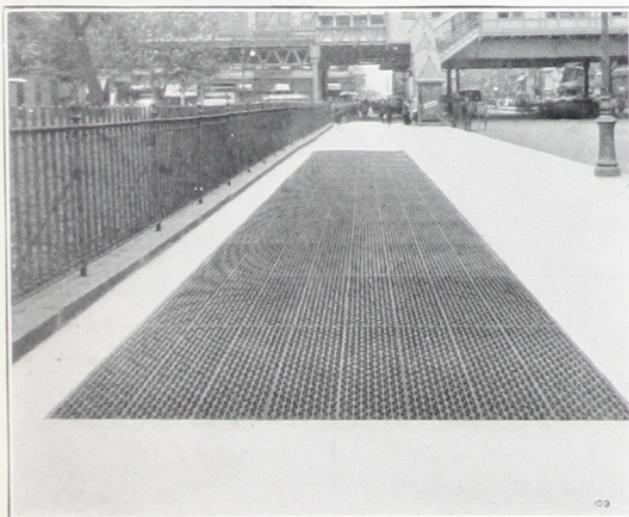
These qualities have created new standards of flooring values and made the selection of the proper floor a vital problem in industrial economy.

About Irving Subway

Measured by these modern standards, **Irving Subway** is the 100% efficient industrial flooring.

Irving Subway came into being with the advent of underground transit in America. This development brought the first demand for area gratings in large quantities, and for the first time warranted the expenditure of time and money in designing and perfecting and producing commercially not merely a grating, but a true grating-flooring.

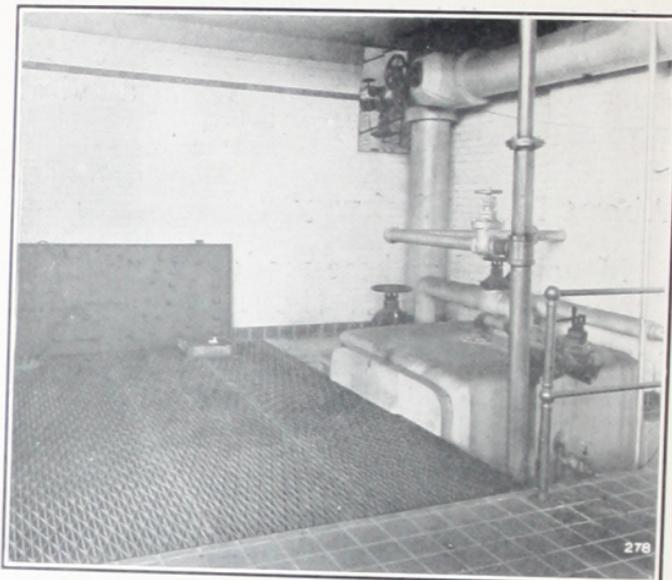
Irving Subway was the result—called



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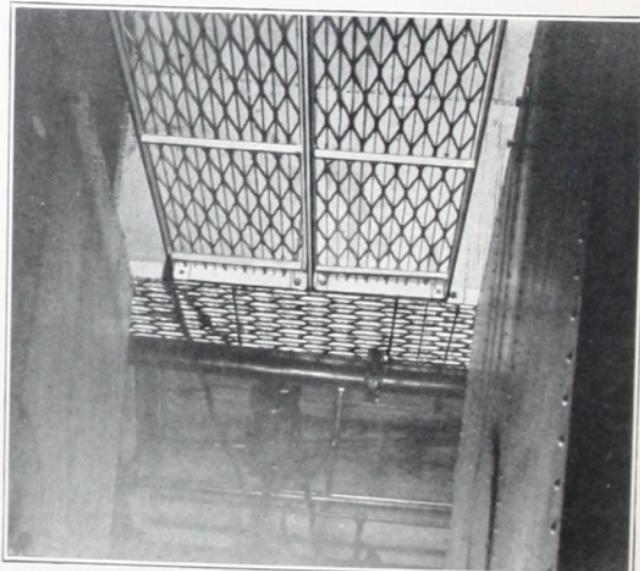
A subway ventilation opening beside Bryant Park, New York, Forty-second Street, near Sixth Avenue. Typical of hundreds of **Irving Subway** installations in New York.

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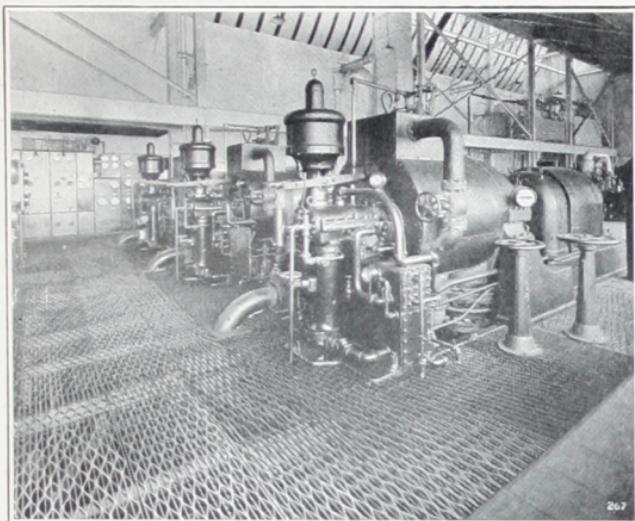
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A typical example of how well **Irving Subway** makes itself a part of the best engineering practice in industrial floors.



Another example of the generous lighting afforded in dark places where **Irving Subway** is used overhead; in a U. S. battleship of late type.

Irving Iron Works Co., Long Island City, N. Y.



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This turbine room floor of **Irving Subway** is safe for the men who work upon it, and cool and comfortable for those below.

for in such large quantities as to justify the design and installation of special machinery for quantity production.

Irving Subway was thus the first grating ever manufactured on a quantity and quality basis. And though the large demands for it which came with the subway systems have long since been supplied, the unquestioned merits of **Irving Subway** as a fire-proof ventilating steel flooring have opened up new and increasing markets—in engineering, industrial, architectural and marine fields—which, in spite of repeated plant enlargements, keep the Irving factory working to capacity.

Irving Subway has ceased to be a mere specialty with a limited field—it has become a recognized engineering product with an almost unlimited field in the industrial world.

Construction

Irving Subway is an all-steel grating-flooring, with the "life" of steel. It consists of a series of parallel steel bars placed on edge, between each pair of which a "Reticuline" bar is placed on edge and solidly riveted in place, with all top edges flush.

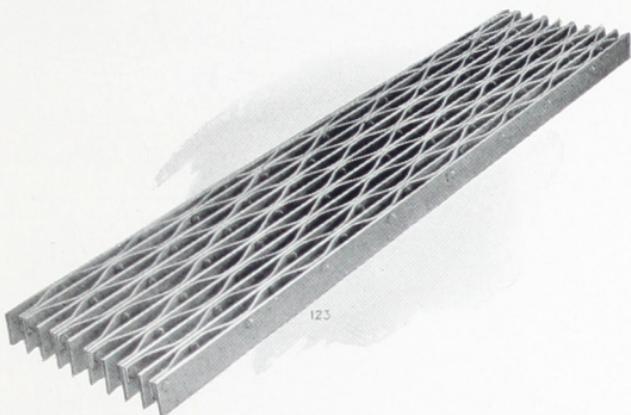
Each finished section is a light but inflexible panel embodying the well-known "truss" principle of engineering construction, by which a load applied at any point is distributed over a wide adjacent area. No one member bears the load; it is shared by a number of adjacent members. And the full tensile strength of each member is applied in load-resistance, because each member is supported at its top chord by the adjoining members either side.

Maximum strength is thus secured with the minimum weight of material. Each panel of **Irving Subway** is, in fact, a solid unit—an "air-cooled plate"—in which there is, and can be, no looseness or play or rattling or warping or twisting.

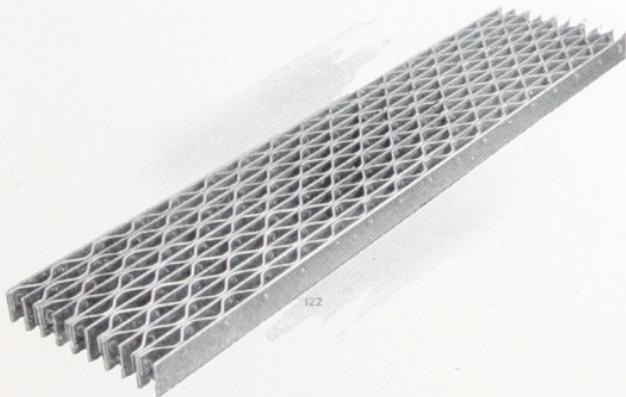
Standard Types

Irving Subway is made in two standard types, differing in appearance and price but not in strength or merit as a grating-flooring. In **Type "G"** the "crimp" of the "Reticuline" bars is elongated to a spacing of 7 inches between rivet centers. In **Type "E"** the "crimp" of the "Reticuline" bars is shorter, with a rivet spacing of $3\frac{1}{2}$ inches. The rated load capacity is the same for both types.

Irving Iron Works Co., Long Island City, N. Y.



Irving Subway, Type "G"
(Patented)



Irving Subway, Type "E"
(Patented)

Irving Iron Works Co., Long Island City, N. Y.



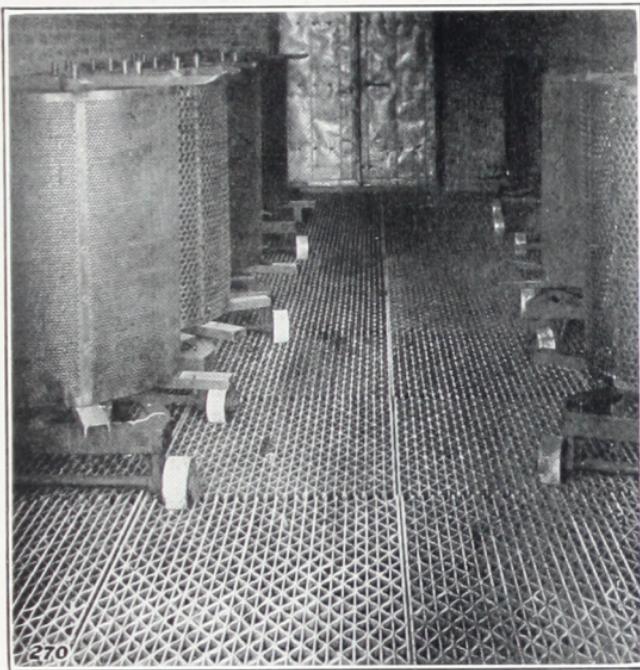
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On Broadway, near Herald Square, New York. With icy, slippery streets, **Irving Subway** is sought for the safe footing it affords.



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Pit covers of **Irving Subway** in a big motor-bus garage.



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In this cable drying oven they handle these roller trucks with perfect ease on the smooth floor of **Irving Subway**.

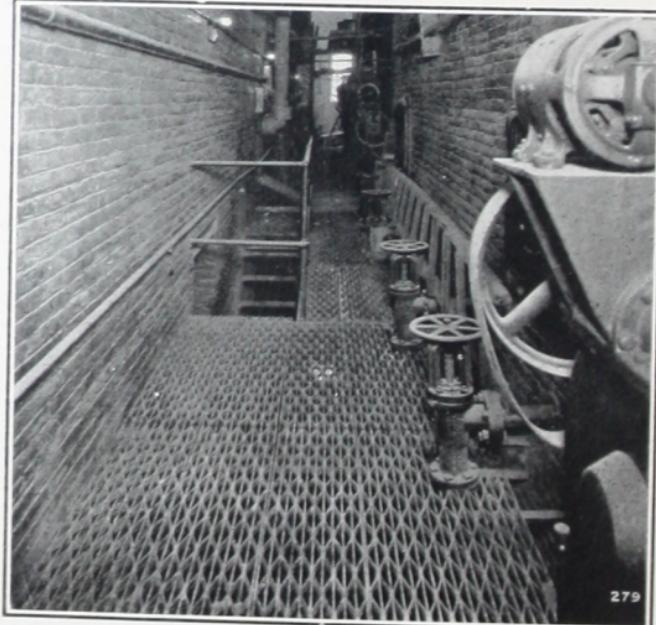
Modified Types

Modifications of these standard “**Subway**” types have been produced on customers’ request by the company, differing from the standards only in the shape of the “crimp” of the “Reticuline” bars. They possess no merit over the standard types beyond that of meeting the personal preferences of some users seeking “something different.” And, being made only in small quantities, their cost is higher.

These modified “Reticuline” types, together with other gratings manufactured by this company, are illustrated on pages 69 to 71.

Exclusive Advantages of Irving Subway

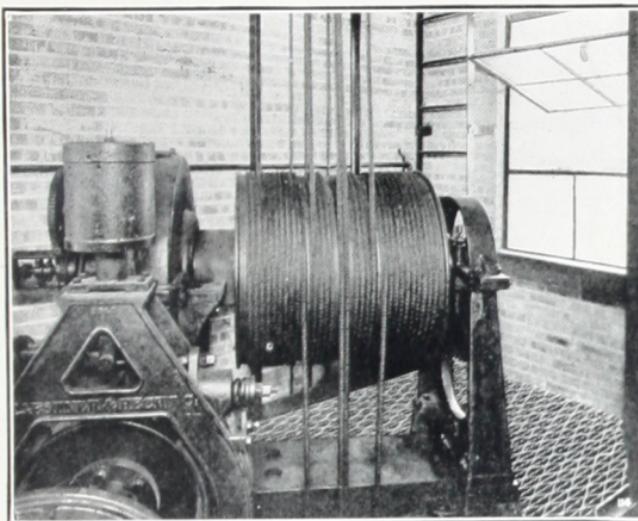
- 1—**A complete open floor**—as smooth and comfortable and noiseless to walk, work or wheel upon as the best solid floor—and far safer.
- 2—**A non-slipping surface**—permanent because an inherent feature of the construction.
- 3—**Rigid as a concrete floor**—yet ventilating and light-saving, with 80% open area.
- 4—**Maximum strength with minimum weight**—the truss construction explains it.
- 5—**Maximum lighting and ventilation**—80% of the total panel area is open space.
- 6—**Never loose or rattle**—solidly riveted, not bolted.
- 7—**Increases personal efficiency**—no need to “watch your step”—takes a man’s mind off his feet.
- 8—**Full strength of material usefully employed**—each member supported and reinforced at its top chord by its two adjacent members.
- 9—**Non-slipping under all conditions**—oil or grease or soap, age or wear, does not impair its non-slipping quality.
- 10—**Clean and sanitary**—dust and dirt fall through, rather than gathering in its spaces.
- 11—**Safe for those beneath**—the individual openings (mesh) are too small for tools or large objects to fall through.



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Irving Subway gives a smooth, cool, safe, comfortable floor in cramped quarters like this, behind the boilers in an industrial power plant.

Irving Iron Works Co., Long Island City, N. Y.

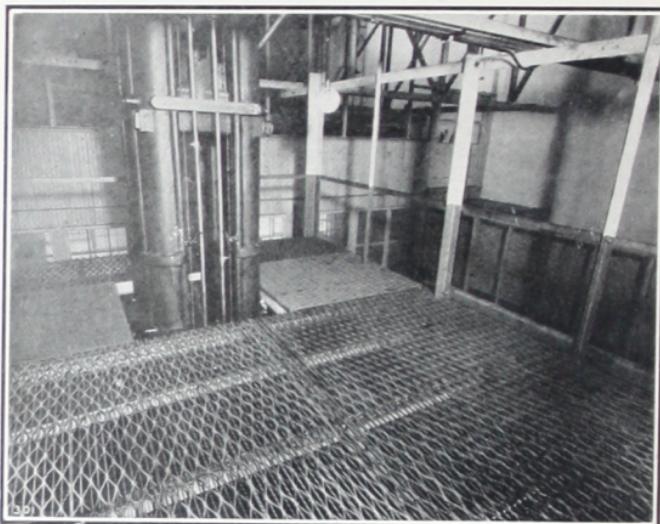


An elevator pent house floored with **Irving Subway**. Illustration furnished by courtesy of the National Safety Council.

- 12—**Cuts more easily than solid plate**—thus easily fitted around pipes, columns, etc., without impairing the strength of the panel.
- 13—**Easily fitted** around machine bases or into irregular spaces—"cuts to fit" readily.
- 14—**Can be handled as a plate**—each panel, in fact, is an "air-cooled" plate.
- 15—**Minimum dead load**—meaning a material saving in weight and cost of supporting structure.
- 16—**Distribution of concentrated loads** over a wide area, as a result of the truss construction.
- 17—**Wheels, trucks, and rib-hooped barrels** roll over it in any direction as easily as over a solid surface —cannot run through.
- 18—**Efficient traction surface**—a splendid surface for power tractors and trailers to work on.
- 19—**Easily installed**—light-weight panels fastened by hook or clips.
- 20—**No drilling or tapping, bolts or screws**—special fasteners hold it securely.
- 21—**Easily moved and rearranged** to accommodate it to floor or plant expansion or readjustment.
- 22—**Safe always**—smooth but permanently non-slipping in all classes of service.

The American Museum of Safety says: "*all surfaces where people walk should be so constructed and maintained that slipping upon them is impossible.*" **Irving Subway** being permanently and inherently non-slipping, fulfills this requirement, absolutely and completely, as no other flooring can.

Irving Iron Works Co., Long Island City, N. Y.



This floor of **Irving Subway** gives a comfortable footing while permitting free ventilation and plenty of light below.

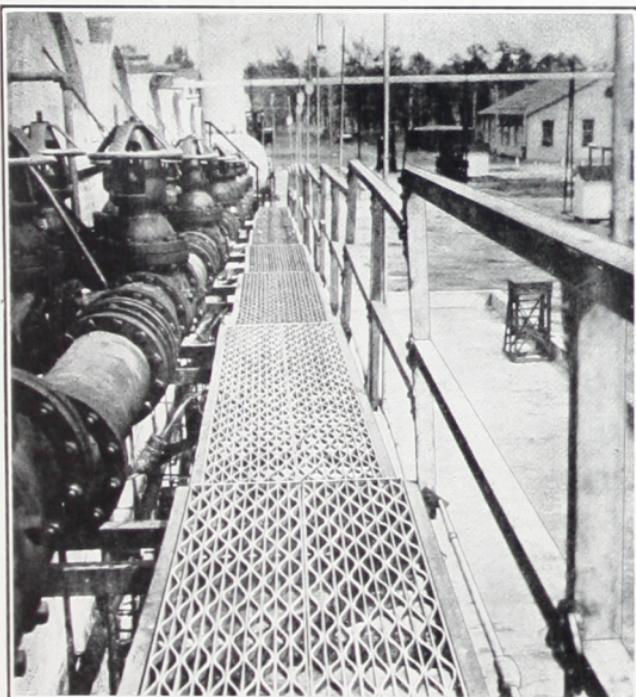
Applications of Irving Subway

Any list of users or applications of **Irving Subway**, however comprehensive, would quickly become incomplete—because new uses are developing every day, as “the big idea” of an open steel flooring takes hold upon engineers and architects.

In the four sections following are listed some applications of **Irving Subway** in the engineering, industrial, marine and architectural fields. These uses will suggest others—for a remarkable fact about **Irving Subway** is that its adoption anywhere for a specific and perfectly obvious purpose, is almost invariably followed by its application in the same plant or structure for some totally different and never-before-thought-of purposes.

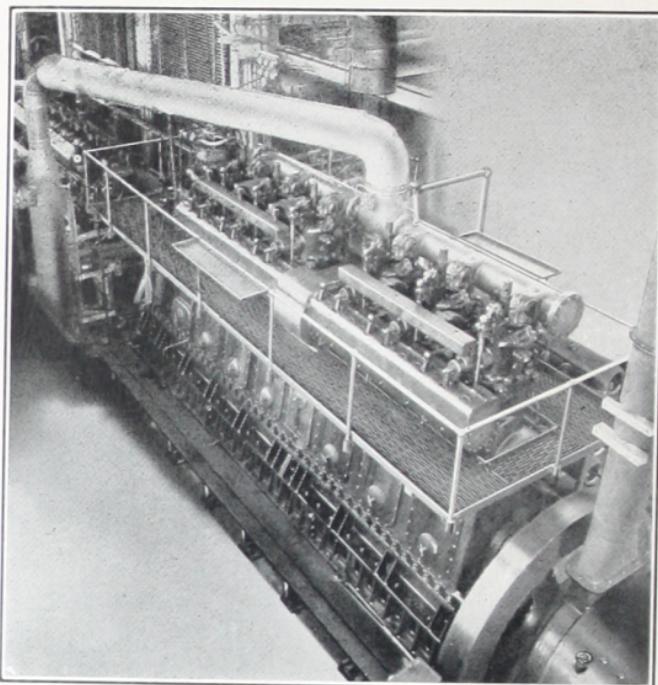
Some Engineering Applications

Flooring and floors—
in power stations
in oil-fired boiler plants
in waterworks and pumping stations
in front of switchboards
around engines, turbines, generators and pumps
over drainage sumps
in pipe and cable tunnels
in gas plants
for signal bridges and towers
for radio towers
over turbine pits
in gas plants
Galleries, walkways and runways—
beside coal conveyors
over coal storage
for switchboards
around gas tanks
in engine and boiler rooms
Cooling beds, in place of water-cooled plates
Cooling floors in steel plants
Armoring for concrete surfaces
Safety steps for ladders and stairs



Pipe gallery of **Irving Subway** in an oil plant; safe under all weather conditions.

Irving Iron Works Co., Long Island City, N. Y.



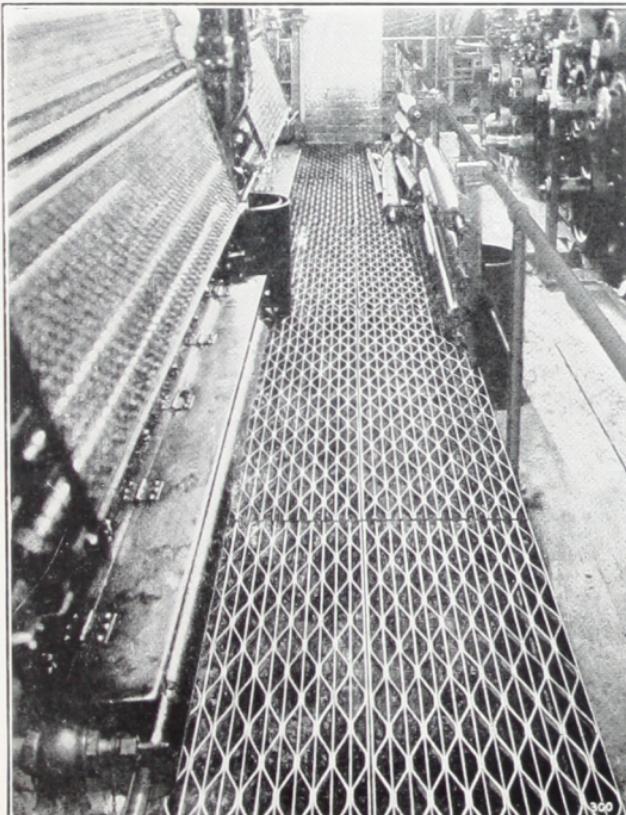
Heavy duty stationary Diesel oil engine with platforms of
Irving Subway.

Some Industrial Applications

Flooring and floors—
around tanks and vats
in dye houses
for kilns
for cable drying ovens
in conditioning rooms
around cupolas and blast furnaces
for shrinkage pits
for core ovens (shelves also)
for knockout and foundry benches
for pattern storage rooms
for filling floors
for all drying purposes
in carpet cleaning establishments
in paint spraying rooms
around centrifugals
around quadruple effects
in tobacco warehouses and sweat houses
in cold storage and refrigerator plants
in grain elevators and mills
in packing plants
in fruit drying and canning plants
in smoke houses
in smelting and milling plants
in oil refineries
in sugar mills and refineries
in chemical plants
for mine cages

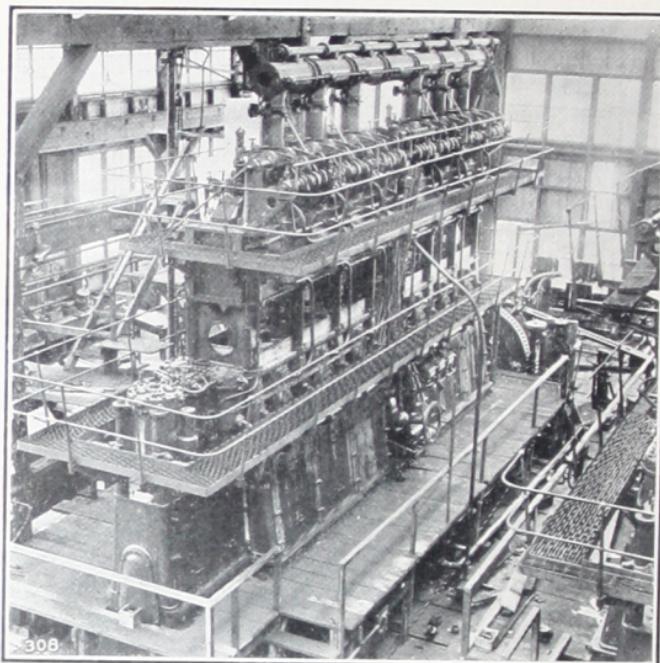
Irving Iron Works Co., Long Island City, N. Y.

for coal tipples, breakers and washeries
for industrial power plants (see Engineering Applications)
around printing presses
Galleries, Walkways and Runways
 around sugar machinery
 in shop and factory stock rooms
 in front of storage racks
Removable mats in front of machine tools
Armoring for concrete surfaces
Mats on lead-covered refrigerator floors
Steps for trolley cars
Steps for passenger coaches
Steps and runways for locomotives
Steps and runways for freight cars
Runways for tank cars
Runways for locomotives
Running boards for motor cars and trucks
Removable mats for laboratories, etc.
Trolley loading platforms
Isles of safety



Irving Subway used as a gallery beside the presses
in a newspaper plant.

Irving Iron Works Co., Long Island City, N. Y.



Galleries of **Irving Subway** surrounding a marine engine of Deisel type—an accessory correct from every marine engineering standpoint.

Some Marine Applications

Floors for engine rooms
Floors for oil-fired boiler rooms
Runways for shaft alleys
Hatchway covers and bridge floors
Ladder steps
Engine room galleries and walkways

Some Architectural Applications

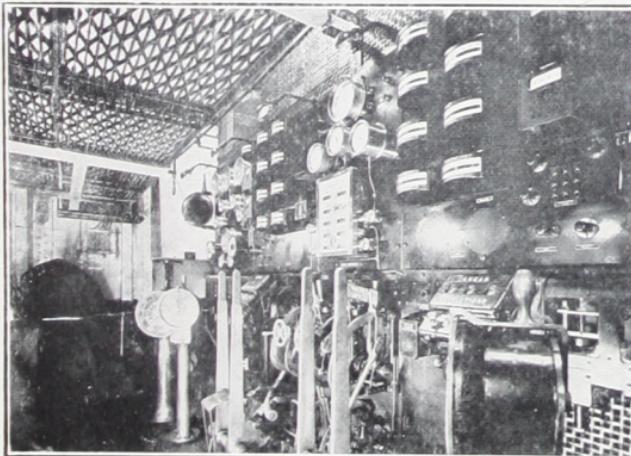
Area covers in front of show windows
Doors over sidewalk elevators and ash hoists
Covers for ventilation shafts
Fire escape landings and steps
Floors for elevator pent houses
Mats for elevator floors
Mats in vestibules
Protection for skylights in courts
Railings, grills and guards
Theatre grid-irons
Furnace registers
Jail corridors and galleries
Fur storage walkways

Some Representative Users

The value returned and the service rendered by a product are evidenced by the character of those who use it, find it profitable, and express their satisfaction by "repeat orders."

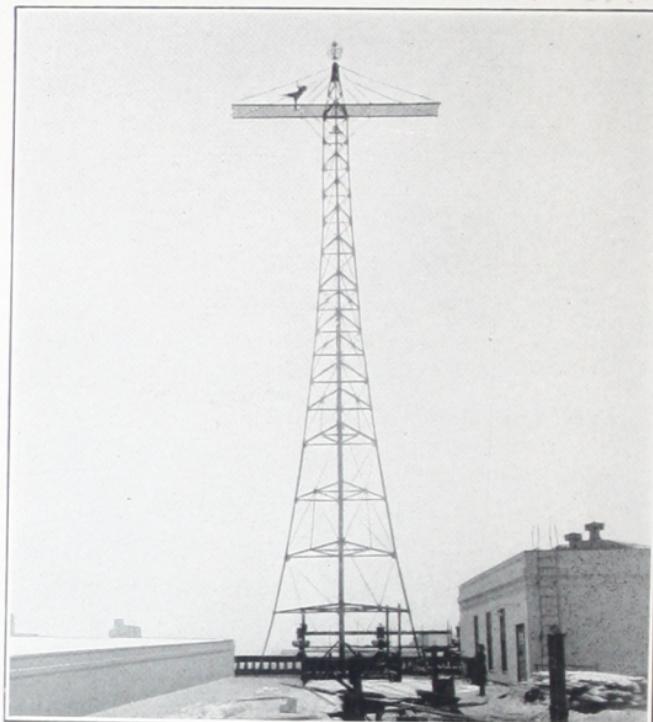
To list all users of **Irving Subway** would require space beyond the limits of this book. But the partial list of well-known concerns, on pages 20 to 27, show not only the great diversity of its field of application but also its nation-wide—if not world-wide—recognition as a big fact in industrial economics.

To an enquirer in any line of business, the company will gladly furnish on request a complete list of **Irving Subway** installations in his own particular industry. A significant index to its uniform success is the number and size of "repeat orders" that have followed small initial orders. And there is no instance of its being discarded as inadequate or unsatisfactory.



Irving Subway over the main control station of U. S. S. New Mexico; photo by courtesy of General Electric Co.

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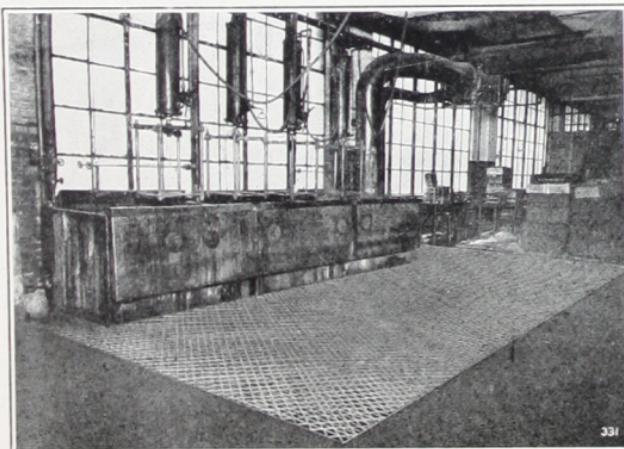
Irving Subway serves as the walkway atop the towers in this radio broadcasting station in New York City.

Some Representative Users of Irving Subway

Adelaide Electric Supply Co. (Australia)
Administrative General, Usine Electrica de Montevideo
Air Reduction Sales Co.
All Navy Yards
Allegheny Steel Co.
Alpha Portland Cement Co.
Aluminum Company of America
American Agricultural Chemical Co.
American Brass Co.
American Bridge Co.
American Can Co.
American Chicle Co.
American Druggist Syndicate Co.
American Ever Ready Works
American Gas & Electric Co.
American Hardware Corporation
American Lead Pencil Co.
American Locomotive Co.
American Smelting & Refining Co.

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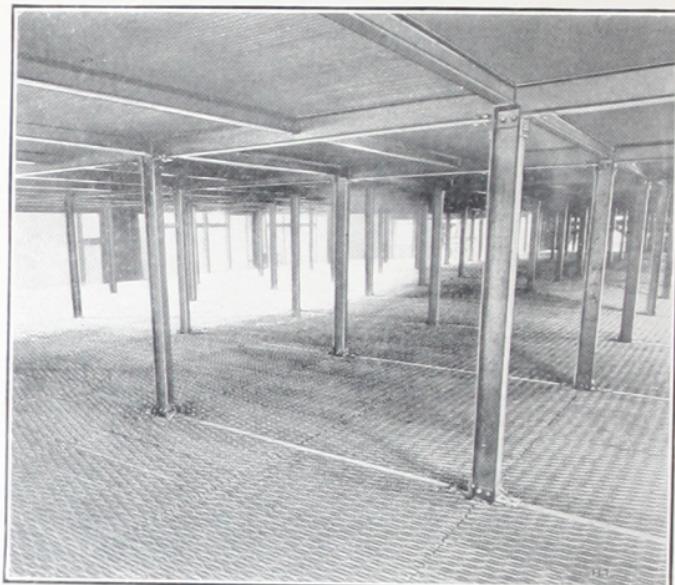
American Steel & Wire Co.
American Sugar Refining Co.
American Thread Co.
American Woolen Co.
Anaconda Copper Mining Co.
Anglin Norcross, Ltd. (Canada)
Armour & Company
Associated Oil Co.
Atlantic Refining Company
Barrett Company
Bell Telephone Company
Bent Co., R. G.
Bethlehem Steel Company
Borden Condensed Milk Co.
Bridgeport Brass Co.
Buckeye Coal Company
Byllesby, H. M., & Co.
Camaguey Electric Co. (Cuba)
Canadian-Niagara Power Co.
Carnegie Ship Company
Carolina Power & Light Co.
Chesapeake & Ohio R. R.
Chicago, Milwaukee & St. Paul R. R.
Chickasaw S. B. Co.
Chili Exploration Co.
Congoleum Company
Consolidated Gas & Electric Co.
Corbin, P. & F.
Corn Products Refining Co.
Cramp, Wm. & Sons, Ship & Engine Bldg. Co.
Crucible Steel Co. of America
Czarnikow-Riondo Co. (Honolulu)



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For the floor in front of tanks like these, **Irving Subway** is ideal—clean and non-slipping always.

Irving Iron Works Co., Long Island City, N. Y.

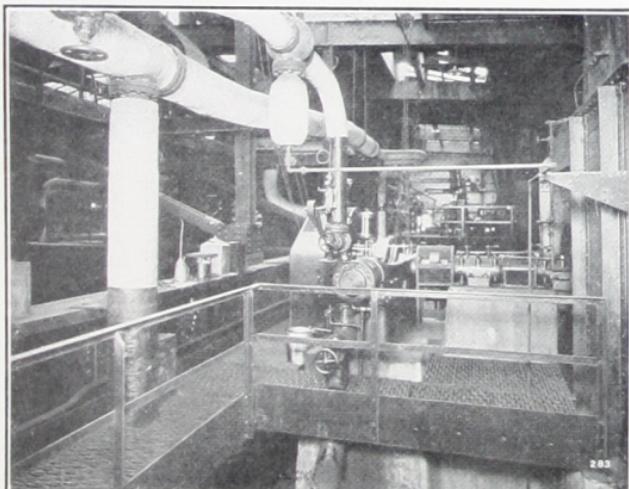


Acres of **Irving Subway** constitute the fire-proof ventilating flooring in this big warehouse.

De Laval Separator Co.
Denver Gas & Electric Co.
Detroit City Gas Co.
Detroit Edison Co.
Diamond Match Co.
Doherty, H. L., Co.
Duquesne Light and Power Co.
Du Pont, E. I., De Nemours Co.
Edison, Thomas A., Co.
Elco Co., The
Essex Rubber Co.
Federal Motor Truck Co.
Federal Sugar Refining Co.
Fibre Conduit Co.
Firestone Tire & Rubber Co.
Firth Carpet Co.
Fleischman Company
Ford Motor Co.
Ford, Bacon & Davis
Fore River Shipbuilding Co.
Foundation Company
Franklin Co., H. H.
Galena Signal Oil Co.
General Chemical Co.
General Electric Co.
General Engineering and Management Co.
General Motors Corp.
Georgia Power & Light Co.
Giant Portland Cement Co.
Goodrich Rubber Co.

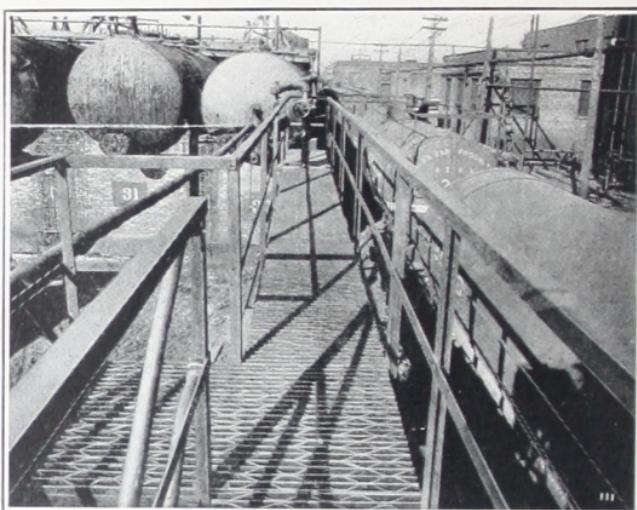
Irving Iron Works Co., Long Island City, N. Y.

Grasselli Chemical Co.
Greenfield Tap & Die Co.
Gulf Refining Co.
Habirshaw Electric Cable Co.
Hawkeye Portland Cement Co.
Hazel Atlas Glass Co.
Heine Safety Boiler Co.
Heppenstahl Forge & Knife Co.
Hercules Powder Co.
Hodgeman Rubber Company
Honolulu Iron Works
Hope, H. M., Engineering Co.
Hudson Motor Car Corp.
Hyatt Roller Bearing Co.
Illinois Central Railroad Co.
Illinois Traction System
Illinois Watch Case Co.
International Nickel Co.
International Paper Co.
Kidde, Walter, & Co., Inc.
Kelsey Wheel Co.
Kentucky & W. Virginia Power Co.
Kenwood Bridge Co.
Knickerbocker Portland Cement Co.
Koppers, H., Co.
Krebs Pigment & Chemical Co.
Lamson Co.
Lane, H. M., Co.
Lawrence, A. C., Leather Co.
Lehigh Portland Cement Co.
Lehigh & Wilkesbarre Coal Co.
Lewiston Bleachery & Dye Works



Could any other form of grating or flooring serve so well for the walkways here shown, as **Irving Subway?**

Irving Iron Works Co., Long Island City, N. Y.

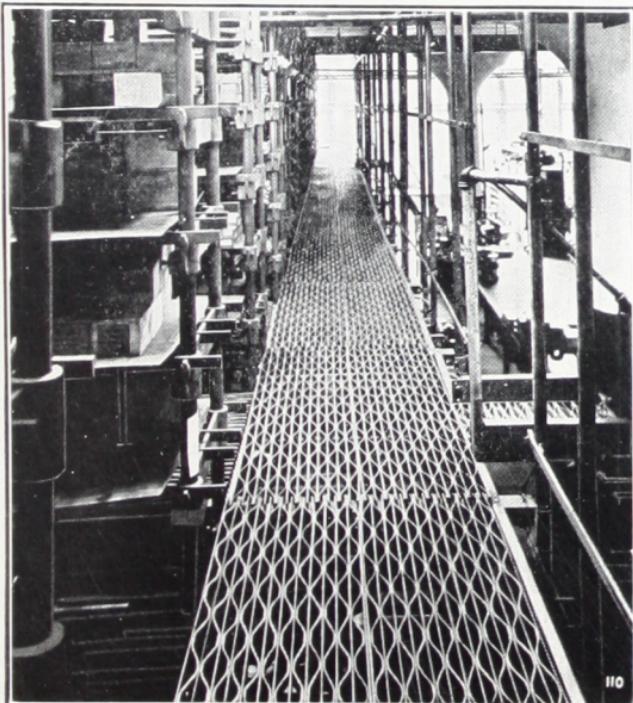


A car loading platform of **Irving Subway** in a tar products plant—safe and non-slipping in all weathers.

Linde Air Products Co.
Loft Candy Co.
Los Angeles Gas & Electric Co.
Louisville Gas & Electric Co.
Louisville Water Co.
Michigan Iron, Land and Lumber Co.
Matheison Alkali Works
Merchants Shipbuilding Co.
Miami Copper Co.
Massachusetts Cotton Mill Co.
Milwaukee Electric Railway & Light Co.
Mobile Shipbuilding Co.
Morgan & Wright
Nash Motors Co.
National Aniline & Chemical Co.
National Carbon Co.
National Sugar Refining Co.
National Tube Works
New Jersey Zinc Co.
Newport News S. B. & D. D. Co.
Newport Turpentine & Resin Co.
New York Central Railroad Co.
New York Edison Co.
Nebraska Gas & Electric Co.
Northwestern Consolidated Milling Co.
Northwestern States Portland Cement Co.
Ohio Match Co.
Oklahoma Pipe Line Co.
Otis Elevator Co.
Pacific Gas & Electric Co.
Pathe Exchange
Parke, Davis & Co.

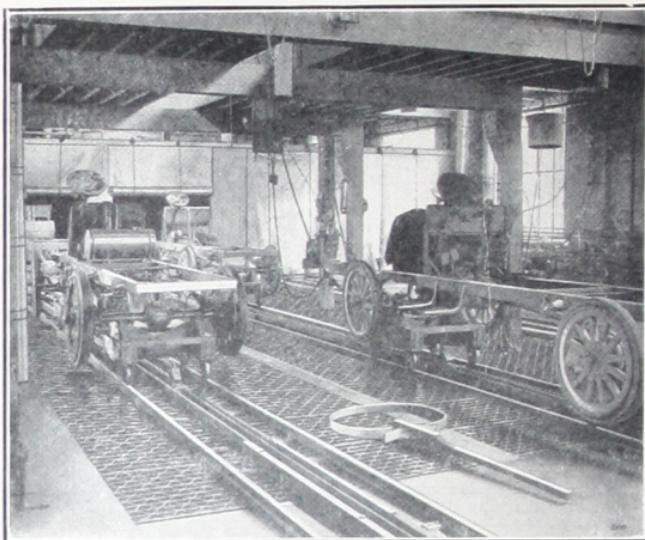
Irving Iron Works Co., Long Island City, N. Y.

Pennsylvania R. R. Co.
Pennsylvania Salt Co.
Pensacola Shipbuilding Co.
Pepsodent Co.
Petroleum Refining Co.
Pierce, S. K., & Co.
Prairie Pipe Line Co.
Pressed Steel Car Company
Procter & Gamble Co.
Radio Corporation of America
Ray Consolidated Copper Co.
Raritan Copper Works
Reynolds Tobacco Co., R. J.
Richmond Light & R. R. Co.
Riter-Conley Co.
Robinson, Dwight P., & Co.
Roebling, John A., Sons Co.
Ron Bacardi Co. (Cuba)
Royal Dutch Shell Oil Co., Ltd.
Russell Erwin Mfg. Co.
St. Louis Coke & Chemical Co.
St. Paul Gas Light Co.
Salts Textile Mfg. Co.
San Joaquin Light & Power Co.



A gallery of **Irving Subway** in the stock room of a large manufacturing plant—plenty of light beneath.

Irving Iron Works Co., Long Island City, N. Y.

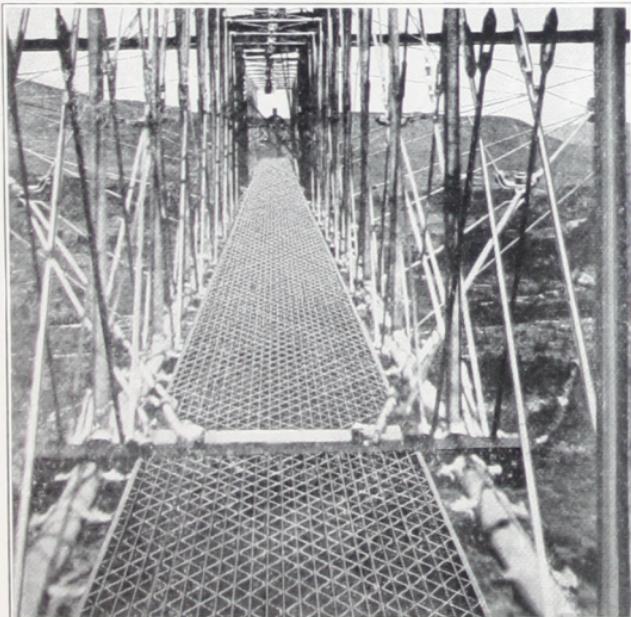


Irving Subway makes the finest kind of a floor over the
paint spray pit in a motor truck or automobile factory.

Sargent & Co.
Seaboard Chemical Co.
Sheffield Farms Co.
Sherwin Williams Co.
Shoemaker Satterthwaite Co.
Simplex Auto. Co.
Sinclair Gulf Refining Co.
Skinner & Eddy
Solvay Process Co.
Southern Cotton Oil Co.
South Porto Rico Sugar Co.
Standard Oil Co.
Standard Oil Cloth Co.
Stone & Webster Engineering Corp.
Submarine Boat Corp.
Sugar Creek Creamery Co.
Superior Coal Co.
Susquehanna Coal Co.
Swift & Co.
Texas Co.
Tidewater Oil Co.
Todd Shipbuilding Corp.
Treadwell Engineering Co.
Turner Construction Co.
Union Bag & Paper Corp.
Union Collieries Co.
Union Oil Co.
U. G. I. Contracting Co.
Union Gas & Electric Co.
United Electric Light & Power Co.

Irving Iron Works Co., Long Island City, N. Y.

United Paper Board Co.
United States Aluminum Co.
United States Gypsum Company
United States Metals Refining Co.
United States Navy Yards
United States Portland Cement Co.
United States Rubber Co.
Vacuum Oil Co.
Valentine & Company
Virginia Power Co.
Walsh Widener Boiler Co.
Weidmann Silk Dyeing Co.
Welsbach Company
West Virginia Pulp & Paper Co.
Weston Electric Co., Chicago
Westinghouse, Church, Kerr & Co.
Westinghouse Electric & Mfg. Co.
White, J. G., Management Corp.
Whittaker Glessner
Wichita Pipe Line Co.
Wilkesbarre & Hazelton Railway Co.
Willard Storage Battery Co.
Winchester Repeating Arms Co.
Wisconsin Gas & Electric Co.
Wright Wire Company
Yale & Towne Mfg. Co.
Youngstown Sheet & Tube Co.



Walkway of **Irving Subway** on the towers of a wireless station in the south.

Irving Iron Works Co., Long Island City, N. Y.

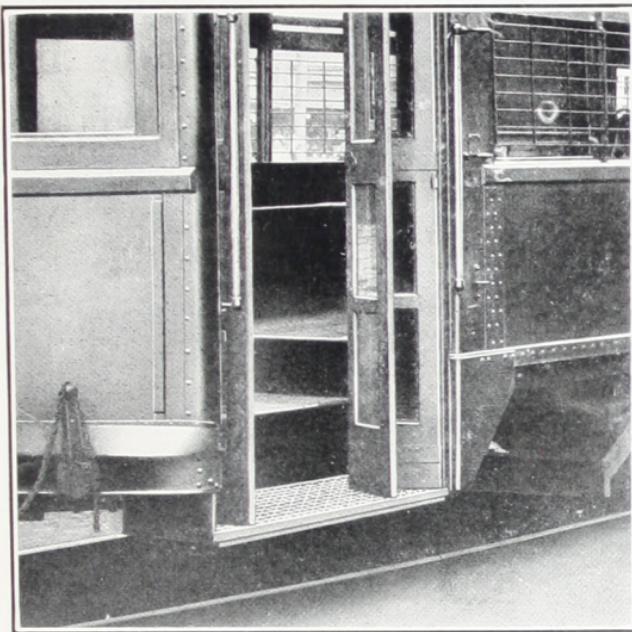


Irving Subway beside tar tanks in a chemical manufacturing plant—the tar does not fill up the flooring, nor spoil its non-slipping surface.

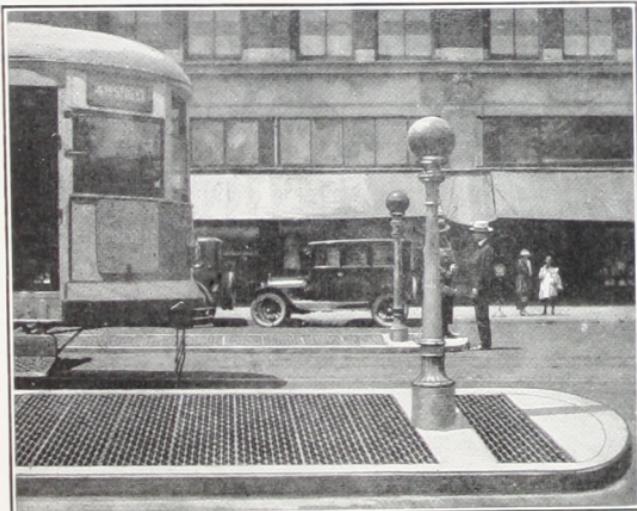
Load Ratings, Spans, Etc.

The table on pages 40 and 41 lists the standard **Irving Subway** types with the load rating for various spans, the size of the members, and factors by means of which the deflection under any contemplated load can be computed for any given span.

Irving Iron Works Co., Long Island City, N. Y.



The **Irving Car Safstep** affords the permanently safe surface that the best modern traction practice demands.



For a trolley loading platform, or "isle of safety," **Irving Subway** is safe, clean, non-slipping, in all kinds of weather.

Stock Units

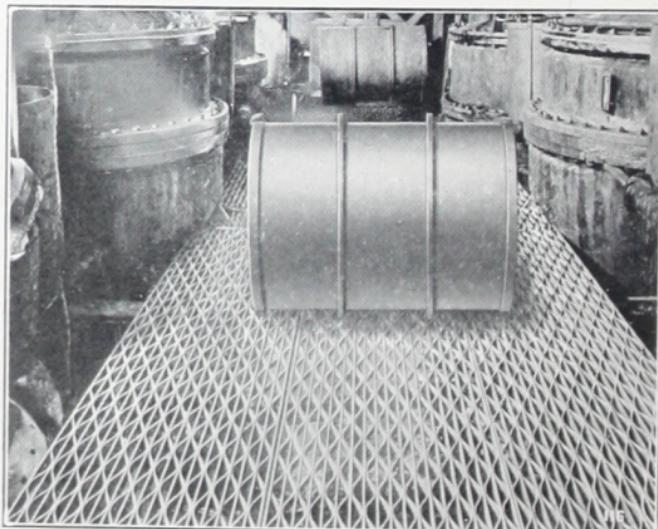
Irving Subway is now carried in stock in standard units which, in combination, provide for covering areas of practically any size and shape. This is one part of **Irving Service** for the convenience and profit of customers.

Why these stock units?

Because they save time both for the customer and the company—not only by expediting deliveries, but also by eliminating secondary lay-outs, transmission of details, changes, approvals, etc.

Why use them in contemplated designs?

Because, in working out new plant designs, it is easier to have **Irving Subway** laid out for you in advance, thus avoiding delay and chances for error in the design and fabrication of your supporting structure.



Rib-hooped barrels roll over **Irving Subway** as easily as over a smooth, solid floor.

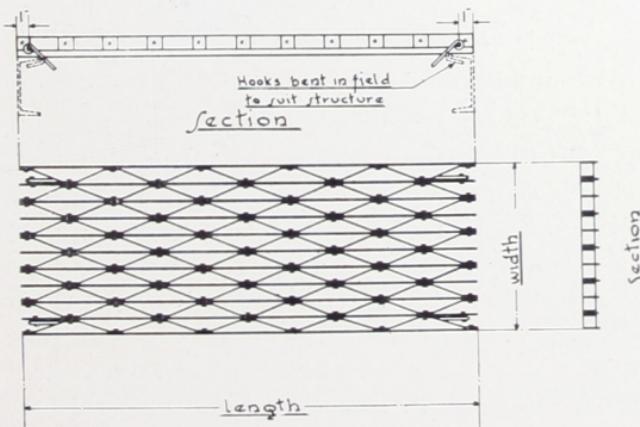
Irving Iron Works Co., Long Island City, N. Y.

Why use them with a completed design?

Because these stock units can be had in 8 widths, 8 depths and 9 lengths—giving 288 possible combinations, among which you will find one or several using stock units that will fill nearly every requirement. (See table below.)

Irving Subway stock units are made in Type "G"—7-inch rivet spacing—the most commonly used type. They are symmetrical in design and are provided with the **Irving** patented adjustable fastening device. (See No. "C-1", page 43.) Stock unit sizes are as tabulated below. For safe loads of various sizes, see the table on pages 40 and 41.

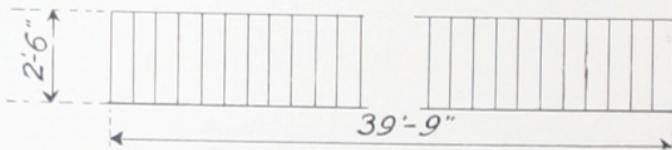
WIDTH For Irving Subway 1 $\frac{3}{4}$, $\frac{1}{2}$, $1\frac{1}{4}$, 2 and $2\frac{1}{4}$ " deep All bars $\frac{1}{8}$ " thick	5 $\frac{1}{4}$	7 $\frac{3}{4}$	10 $\frac{1}{4}$	22 $\frac{3}{4}$
WIDTH For Irving Subway 1 $\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{1}{4}$, 2 and $2\frac{1}{4}$ " deep Straight bars $\frac{1}{8}$ " thick Reticuline bars $\frac{1}{8}$ " thick	5 $\frac{9}{16}$	8 $\frac{5}{16}$	10 $\frac{13}{16}$	13 $\frac{3}{4}$
LENGTH				
1'-3 $\frac{1}{4}$ " 1'-10 $\frac{1}{4}$ " 2'-5 $\frac{1}{4}$ " 3'-0 $\frac{1}{4}$ " 3'-7 $\frac{1}{4}$ " 4'-2 $\frac{1}{4}$ " 4'-9 $\frac{1}{4}$ " 5'-4 $\frac{1}{4}$ " 5'-11 $\frac{1}{4}$ "				



An Example of Stock Unit Application

On almost any contemplated operation, the arrangement of openings or supports to take **Irving Subway** stock units is simple. Some conditions, of course, cannot be met with these "ready-made" units—in which case standard "made-to-order" panels will be needed. (See notes, table, pages 40 and 41.) But, for example, a difficult condition will be assumed and a possible solution worked out.

Suppose that a walkway 2' 6" wide and 39' 9" long is wanted. Assume that the loading is found—by reference to the Safe Load Table, pages 40-41, to require **Irving Subway** $\frac{3}{4}$ " deep.



The length of the nearest stock unit is found to be 2' $5\frac{1}{4}$ " (Stock Unit Table, page 31). In the great majority of cases, this difference of $\frac{3}{4}$ " is not serious and this stock unit length will be O. K.

To fill the walkway length of 39' 9", we find by reference to the table, page 31, that 20 stock units $22\frac{3}{4}$ " x 2' $5\frac{1}{4}$ " will give a length of 37' 11", leaving a space of 1' 10" which can be filled with two stock units $10\frac{1}{4}$ " x 2' $5\frac{1}{4}$ "—a total of 39' $7\frac{1}{2}$ ". The remainder, $1\frac{1}{2}$ ", will give a nice clearance of about $\frac{1}{16}$ " between the several stock units.

Irving Iron Works Co., Long Island City, N. Y.

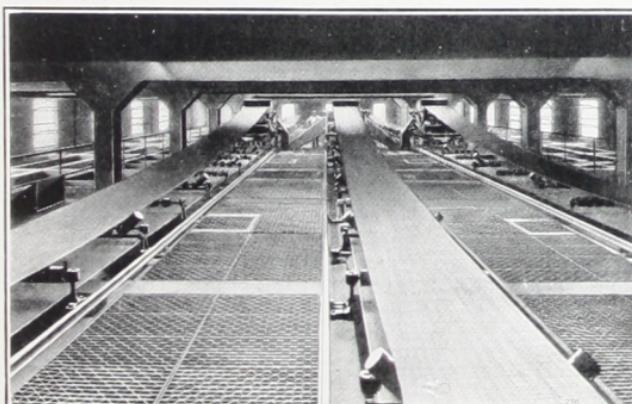
The order for this job, then, would read:
20 Stock Units, **Irving Subway**, Type
"G," I-S., $\frac{3}{4}$ " deep, $22\frac{3}{4}$ " x $2' 5\frac{1}{4}$ ";
2 Stock Units, **Irving Subway**, Type
"G," I-S., $\frac{3}{4}$ " deep, $10\frac{1}{4}$ " x $2' 5\frac{1}{4}$ ",
which is the proper forms of ordering,
as per instructions beneath the table on
pages 40-41.

Irving Trade Marks

The following trade mark names have
been registered by this company in con-
nection with grating and grating-flooring:

"Subway"
"Safstep"
"Reticuline"
"Sunway"
"Sublit"

All carry the standard **Irving** guarantee
as to quality, uniformity, and superiority
of design. They can be used by no other
manufacturer in connection with products
in this line.



Irving Subway makes a safe, ventilating floor between
the conveyors in a grain elevator.

IRVING SUBWAY FLOORING

FOR BOILER AND ENGINE ROOMS, IN POWER STATIONS, PUMPING STATIONS, INDUSTRIAL PLANTS, SHIPS, ETC.

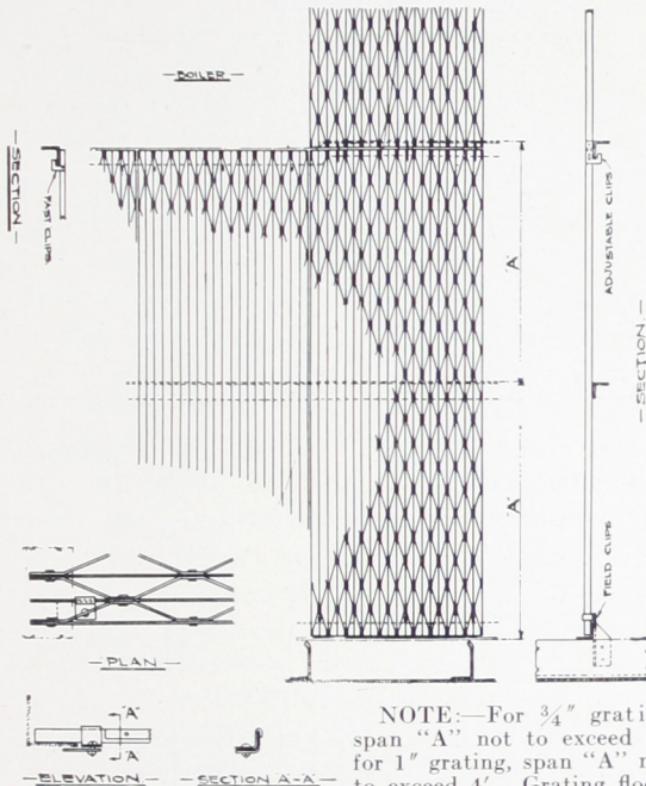
As a boiler and engine-room flooring in power stations and on oil-fired steamships, **Irving Subway** stands supreme. Its non-slipping, non-oil-retaining surface gives the finest kind of footing, and means comfort for the working force. In addition, the use of **Irving Subway** in oil-fired ships in place of bump steel plates directly over the bilge, prevents the accumulation of gases there.

Its 80% opening permits free circulation of air, and keeps the engine and boiler rooms well ventilated and comfortable. Plenty of light can pass through it to the otherwise dark spaces below. Its light, sectional construction makes it easy to install. Wherever an opening is wanted later, a section or more can be removed. Or if changes in arrangement are needed, they are easily made at any time.

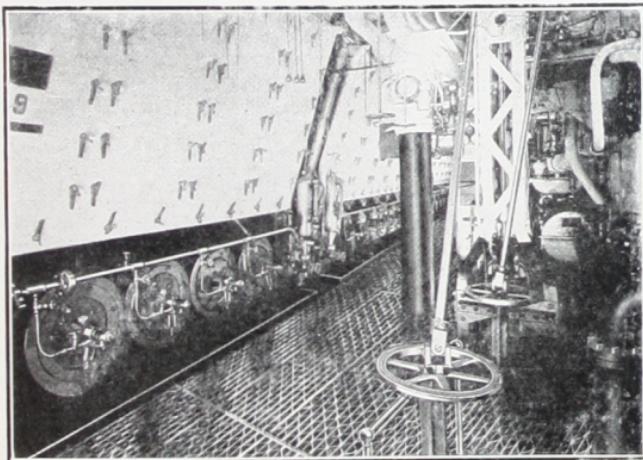
A combination of **Irving Subway** for flooring, **Irving Walkways** for galleries, and **Irving Safsteps** for ladders or stairs, makes the finest kind of safety equipment for the up-to-date power plant or ship. And the under-foot security it gives the men, makes for better work on their part.

A number of typical installations are illustrated throughout these pages. The drawing on the opposite page shows some construction details.

Irving Iron Works Co., Long Island City, N. Y.



NOTE:—For $\frac{3}{4}$ " grating span "A" not to exceed 3'; for 1" grating, span "A" not to exceed 4'. Grating flooring made up in units about 24" by 6', each unit provided with 6 adjustable clips as shown, making the units easily removable and taking supports as provided for common plate flooring. No drilling of supports necessary. Adjustable field clips provided for special fittings.



IRVING SAFETY WALKWAYS

FOR POWER STATIONS, INDUSTRIAL PLANTS,
SHIPS, ETC.

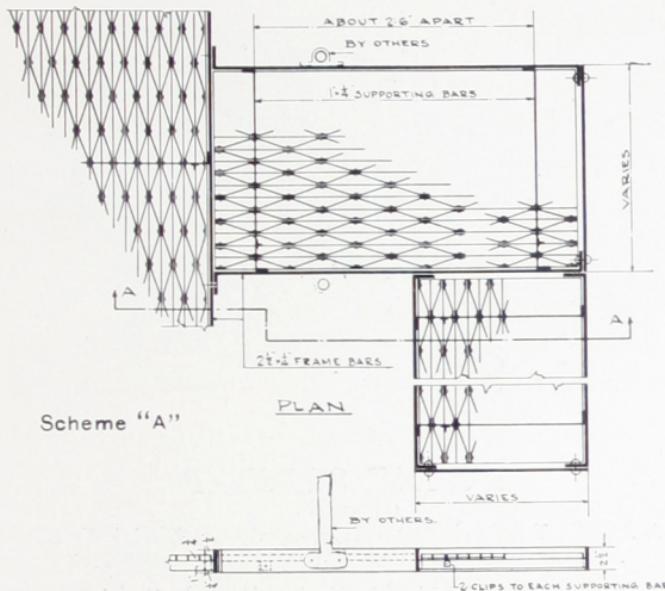
For elevated or suspended walkways, or galleries, **Irving Subway** offers advantages found in no other grating or metallic flooring. Its non-slipping surface—not affected by water, oil or grease—gives a safe footing always, with comfort and security in walking or working upon it.

Its great strength and rigidity, coupled with its very light weight, make installation easy and inexpensive because only the lightest supporting framework is needed. Usually, a walkway or gallery of **Irving Subway** can be hung from or attached to the frame of an existing structure, without any reinforcement and without going beyond the safe load.

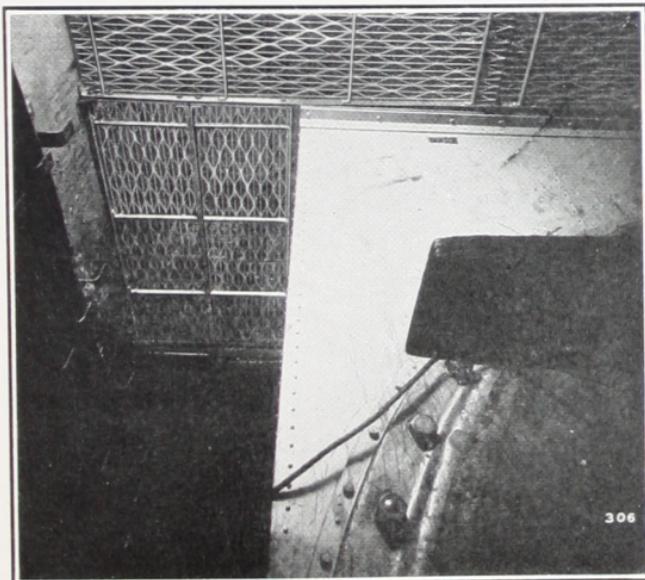
The 80% opening does not impair lighting conditions below, and the small mesh prevents any but the smallest objects from passing through.

The drawing on the opposite page—Scheme "A"—gives construction details of what is usually used aboard ship. A number of other arrangements are available. Walkways are delivered assembled complete in convenient units, including grating, side bars and supporting bars, ready for erection. The gratings are always removable from their frames. Special allowances are provided on walkways for fitting on the job, when actual dimensions are doubtful. All positive connections and holes are provided.

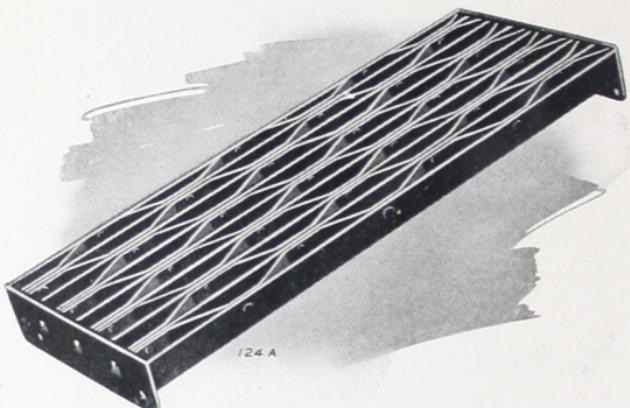
Irving Iron Works Co., Long Island City, N. Y.



Grating: straight bars, $\frac{3}{4}$ "x $\frac{1}{8}$ "; reticuline bars, $\frac{1}{2}$ "x $\frac{1}{8}$ ".



Irving Walkway on U. S. S. "Tennessee"—observe the generous light admitted to the space beneath.



IRVING SAFSTEP

(Patented)

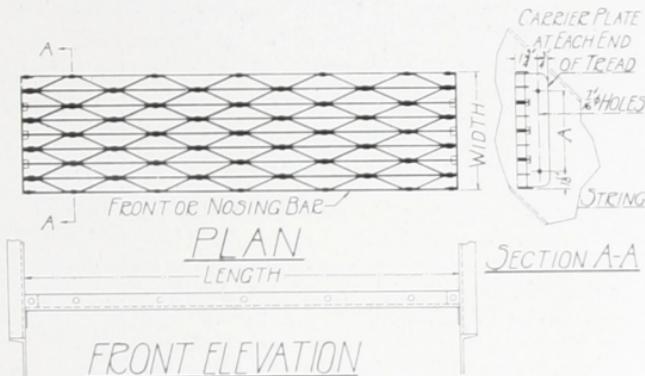
A SAFETY STAIR OR LADDER STEP FOR POWER
AND INDUSTRIAL PLANTS, MARINE
EQUIPMENT, FIRE ESCAPES, ETC.

Originally, the **Irving Safstep** was simply a special application of **Irving Subway** in small panels. But it has gained such popularity that it is now a distinct and standard product in the **Irving** line. Each **Safstep** is a complete, self contained unit with its own carriers, easily installed, safer and more durable than any other step.

Safety, under all conditions, is the big feature of the **Irving Safstep**. It retains its non-slipping properties, even with oil, grease, soap or water upon it. It is general-purpose step, for indoor or outdoor service, anywhere. Wear does not impair its non-slipping surface—there are no separate treads or abrasive insets to wear out or work loose. It does not fill up with dirt, and is clean and sanitary. It is a comfortable step to use, anywhere.

Standard sizes and specifications are given on the opposite page.

Irving Iron Works Co., Long Island City, N. Y.



IRVING SAFSTEPS Standard Sizes

Complete units assembled with punched carrier plates attached, ready for setting.

Safstep No. 1—Specifications

Type G Flooring			
WIDTH	LENGTH	DISTANCE "A"	
5 3/8	1'-7"	2'-2"	2 1/2"
7 3/8	1'-7"	2'-2"	4 1/2"
10 3/8	1'-7"	2'-2"	7"
1'-10 1/2"	2'-2"		
1'-10 1/2"	2'-2"		
1'-10 1/2"	2'-2"		

Safstep No. 2—Specifications

Type G Flooring			
WIDTH	LENGTH	DISTANCE "A"	
5 3/8	2'-5 1/2"	3'-0 1/2"	2 1/2"
7 3/8	2'-5 1/2"	3'-0 1/2"	4 1/2"
10 3/8	2'-5 1/2"	3'-0 1/2"	7"
2'-5 1/2"			
2'-5 1/2"			
2'-5 1/2"			

Safstep No. 3—Specifications

Type G Flooring			
WIDTH	LENGTH	DISTANCE "A"	
8 1/4	3'-7 1/2"	4'-6"	4 1/2"
10 3/8	3'-7 1/2"	4'-6"	7"
12 3/8	3'-7 1/2"	4'-6"	7"
3'-11"			
3'-11"			
3'-11"			

Irving Iron Works Co., Long Island City, N. Y.

**TABLE OF SAFE LOADS—*Irving*
MAXIMUM ALLOWABLE FIBER STRESS, 16,000 lbs.**

L = Safe load in lbs. per sq. ft.

SIZE, SYMBOL AND SPECIFICATION			1'-6"	2'-0"	2'-6"	3'-0"
Flooring, $\frac{1}{2}$" deep Symbol, 0S	Straight Bars $\frac{1}{2}" \times \frac{1}{8}"$ Reticuline Bars $\frac{3}{8}" \times \frac{1}{8}"$	L C	308 .00029	173 .00092	110 .00227	77 .0048
Flooring, $\frac{3}{4}$" deep Symbol, 1S	Straight Bars $\frac{3}{4}" \times \frac{1}{8}"$ Reticuline Bars $\frac{1}{2}" \times \frac{1}{8}"$	L C	695 .000045	390 .00011	250 .00069	173 .00143
Flooring, 1" deep Symbol, 2S	Straight Bars $1" \times \frac{1}{8}"$ Reticuline Bars $\frac{3}{4}" \times \frac{1}{8}"$	L C		695 .00012	445 .00029	308 .0006
Flooring, 1" deep Symbol, 2SA	Straight Bars $1" \times \frac{3}{16}"$ Reticuline Bars $\frac{3}{4}" \times \frac{1}{8}"$	L C			1040 .00008	665 .00019
Flooring, $1\frac{1}{4}$" deep Symbol, 3SA	Straight Bars $1\frac{1}{4}" \times \frac{1}{8}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				700 .00015
Flooring, $1\frac{1}{4}$" deep Symbol, 3S	Straight Bars $1\frac{1}{4}" \times \frac{3}{16}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				1100 .0001
Flooring, $1\frac{1}{2}$" deep Symbol, 4SA	Straight Bars $1\frac{1}{2}" \times \frac{1}{8}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				1020 .00008
Flooring, $1\frac{1}{2}$" deep Symbol, 4S	Straight Bars $1\frac{1}{2}" \times \frac{3}{16}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				1530 .00006
Flooring, $1\frac{3}{4}$" deep Symbol, 5S	Straight Bars $1\frac{3}{4}" \times \frac{3}{16}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				2060 .00004
Flooring, 2" deep Symbol, 6S	Straight Bars $2" \times \frac{3}{16}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				2700 .00003
Flooring, $2\frac{1}{4}$" deep Symbol, 7S	Straight Bars $2\frac{1}{4}" \times \frac{3}{16}"$ Reticuline Bars $1" \times \frac{1}{8}"$	L C				3460 .00002



Type "G"



Type "E"

DEFLECTIONS—To obtain the deflection under any uniform load per square foot on a given span, multiply your load per square foot by the deflection

STANDARD CONSTRUCTION

SPACING

TYPES "D," "G," and "M"— $1\frac{1}{2}$ inches from center to center of straight bars when $\frac{5}{8}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{3}{4}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

TYPE "E"— $1\frac{1}{2}$ inches from center to center of straight bars when $\frac{5}{8}$ inch thick; $1\frac{1}{4}$ inches from center to center of straight bars when $\frac{3}{4}$ inch thick; rivet spacing, $3\frac{1}{2}$ inches center to center on straight bars.

TYPE "K"— $\frac{5}{8}$ inches from center to center of straight bars when $\frac{5}{8}$ inch thick; $\frac{7}{8}$ inches from center to center of straight bars when $\frac{3}{4}$ inch thick; rivet spacing, 7 inches center to center on straight bars.

STANDARD MADE-TO-ORDER UNITS

All types of **Irving Subway** are also made to order for prompt shipment, to fit **any** opening and to meet any conditions. When made to order, **Irving Subway** is shipped in units or panels properly marked and accompanied by setting plans.

Irving Iron Works Co., Long Island City, N. Y.

DS-II ING SUBWAY—ALL TYPES
FIBER ST
SS, 16,000 LBS. PER SQUARE INCH

C = Deflection constant

2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	7'-0"	8'-0"	9'-0"
110 .00227	77 .0048									
250 .00069	173 .00143	127 .00265	97 .0040	77 .0055	63 .0083					
445 .00029	308 .0006	227 .00112	173 .0019	138 .00305	112 .00465	93 .0068				
665 .00019	460 .0004	340 .00075	260 .00127	206 .00204	167 .0031	140 .00454	116 .00645			
700 .00015	480 .00031	358 .00057	273 .00097	215 .00155	175 .00235	143 .00348	120 .0049			
1100 .0001	730 .00021	535 .00038	410 .00065	325 .00105	265 .0016	215 .0024	185 .0033	135 .0062	100 .0105	80 .0169
1020 .000087	707 .000178	516 .000333	396 .00057	314 .00091	253 .00138	210 .00203	173 .00287	130 .0053	100 .00903	77 .0145
1530 .00006	1050 .00012	775 .00023	595 .00038	470 .00061	380 .0009	315 .0014	265 .0019	202 .0036	150 .0061	115 .0097
2060 .00004	1435 .00008	1050 .00014	810 .00024	635 .00038	520 .00058	425 .00085	360 .0012	265 .0022	200 .0038	160 .0061
2700 .00003	1875 .00005	1375 .00009	1055 .00016	830 .00025	675 .00039	560 .00057	470 .0008	345 .0015	265 .0026	210 .0041
3460 .00002	2400 .00004	1765 .00007	1350 .00011	1065 .00018	865 .00027	715 .0004	600 .00057	440 .0011	340 .0018	265 .0029



Type
"D"



Type
"M"

constant "C" from the table for your given span. The result will be the deflection in inches at center of span under your actual load.

CONSTRUCTION

These units—in the $\frac{1}{2}$, $\frac{3}{4}$ and 1-inch depths, if no larger than 24 inches wide by 72 inches long—and in the $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2 and $2\frac{1}{4}$ -inch depths, if no larger than $13\frac{1}{2}$ inches wide by 72 inches long—sell at the regularly quoted square foot rates.

If larger than these sizes, there is a small extra charge. Anything smaller than these units are also standard and sell at the regularly quoted square foot rate.

We limit the size of the units, not only to simplify manufacture, but also to facilitate installation and to make removal or rearrangement easy.

PAINT AND FASTENING DEVICES

Quoted prices always include one shop coat of paint, and fastening devices.

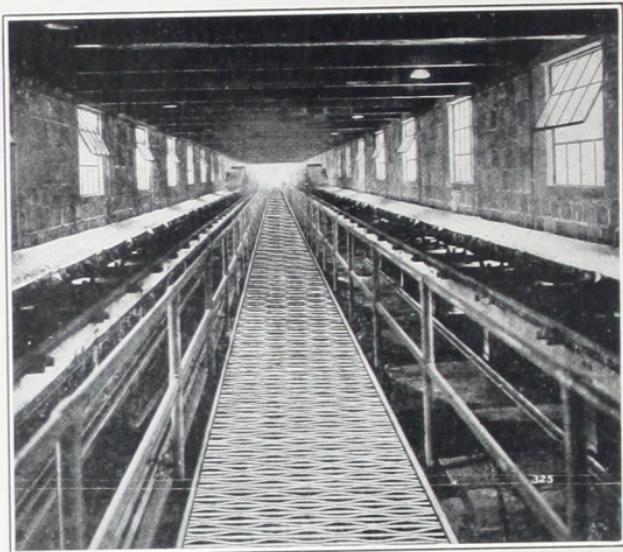
ORDERS

Orders should designate type, symbol and depth, to avoid mistake; thus,

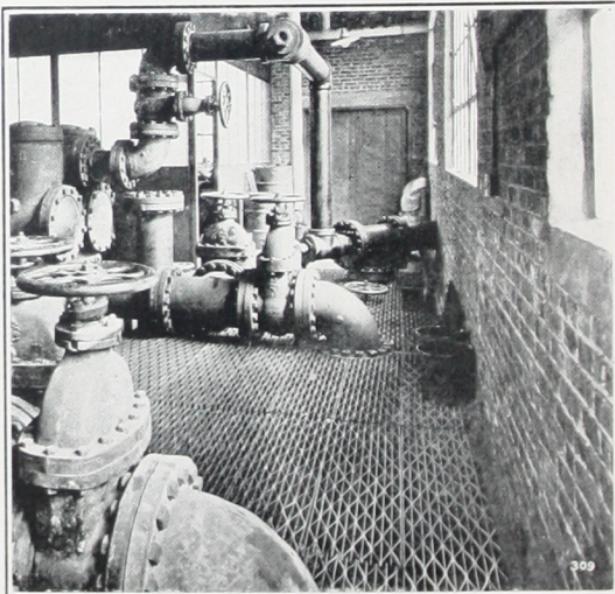
Irving Subway Type G, 3S, $1\frac{1}{4}$ " deep.

Show the supporting structure and outline the area to be covered. Let us make the **Irving Subway** layout for your approval.

Irving Iron Works Co., Long Island City, N. Y.

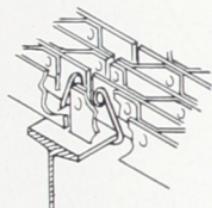


Irving Walkway installed over the coal storage in a power station.



Illustrating the readiness with which **Irving Subway** lends itself to power plant floor requirements.

IRVING PATENTED SUBWAY FASTENERS

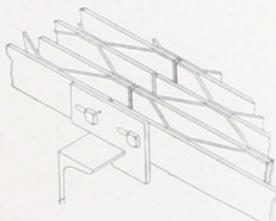
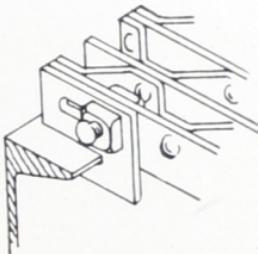


C-1

1/4-Inch Round Hooks:—
Standard Equipment unless otherwise specified by customer; sometimes furnished straight, of varying lengths, and bent in the field.

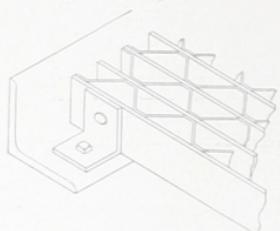
C-2

Adjustable Clip:—Designed especially for use aboard ship, but applicable anywhere that flooring is subjected to use which tends to dislodge the panels.



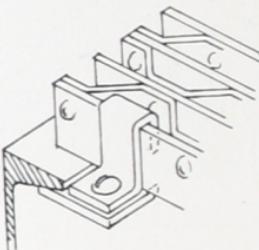
C-3

Adjustable Clip—Special: Especially adapted to cases where flooring units should be bolted end to end; recommended on inclined floors or runways.



C-4

Fixed Clip:—For permanently attaching to angle frames, wood curbs, etc.; requires accurate location of holes when used with steel supports.



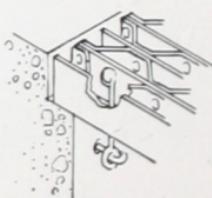
C-5

Adjustable Field Clip:—Especially adapted to ship work and other installations where exact location of supporting members is indefinite; can be placed anywhere on the flooring unit.



C-6

U-Loop Clip:—For fastening flooring units to angle frame; especially designed for the New York Subway ventilating chamber gratings.



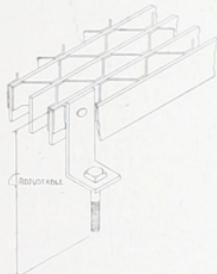
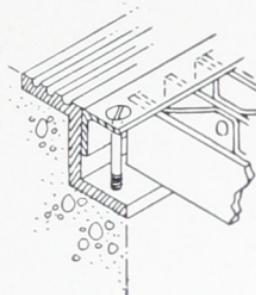
C-7

Expansion Bolt Clip:—For securely anchoring flooring to concrete walls, trenches, etc.

Irving Iron Works Co., Long Island City, N. Y.

C-8

Cover Angle Clip:—Refined detail for use with cast iron or angle frames for high class city office and residence work.

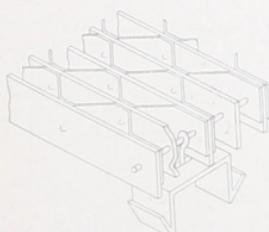
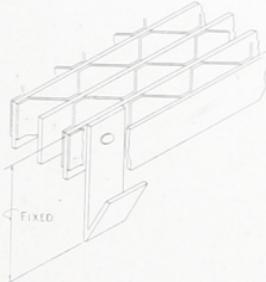


C-9

Armoring Clip, Adjustable:—For anchoring "Subway" when used as concrete armor; adjustable to suit surface of concrete.

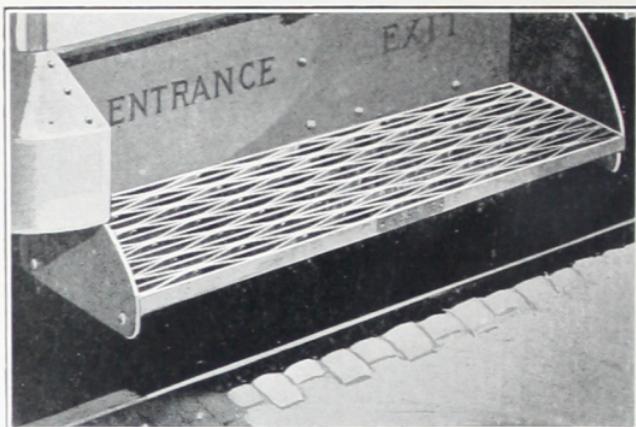
C-10

Armoring Clip, Fixed:—Non-adjustable anchor for "Subway" used as concrete armor.



C-11

Armoring Support and Clip:—Designed to be set in the under or rough concrete just after pouring same; "Subway" can then be installed on same and finish floor poured and troweled.



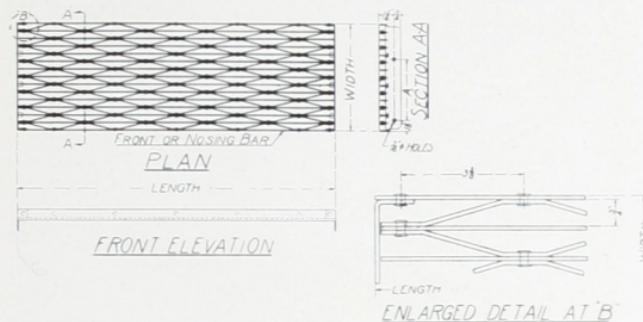
IRVING CAR SAFSTEP
FOR STREET, INTERURBAN AND STEAM
RAILWAY SERVICE

This is a logical development of the standard **Irving Safstep**. Speed, with comfort and safety, is the idea back of it. Whatever the style of the car, the **Safstep** will make it safer and more comfortable for passengers and employes, make for cleaner cars, speed up loading and unloading, and reduce car-step accidents.

The **Safstep** is permanently non-slipping—wet or dry. It is light in weight, but extremely strong and practically indestructible. Dust and dirt fall through it, reducing the amount tracked into a car. "Hurry-up" traffic is easily accommodated because of its non-slipping quality which wear does not destroy. The mesh is close enough so that canes or crutches will not readily slip through. The warning "watch your step" is not needed, when a car is equipped with **Safsteps**.

The **Irving Car Safstep** is made in sizes to suit any style of car. Standard sizes are listed on next page.

Irving Iron Works Co., Long Island City, N. Y.



IRVING CAR SAFSTEPS Standard Sizes

Complete units assembled with punched carrier plates attached, ready for setting.

Car Safstep No. 1—Specifications

STRAIGHT BARS			$\frac{3}{4} \times \frac{1}{8}$	Type K Flooring
RETICULINE BARS	$\frac{1}{2} \times \frac{1}{8}$			
WIDTH	LENGTH		DISTANCE "A"	
$5\frac{5}{8}$	1'-7"	1'-10 $\frac{1}{2}$ "	2'-2"	$2\frac{1}{2}"$
$8\frac{1}{4}$	1'-7"	1'-10 $\frac{1}{2}$ "	2'-2"	$4\frac{1}{2}"$
$10\frac{1}{8}$	1'-7"	1'-10 $\frac{1}{2}$ "	2'-2"	7"

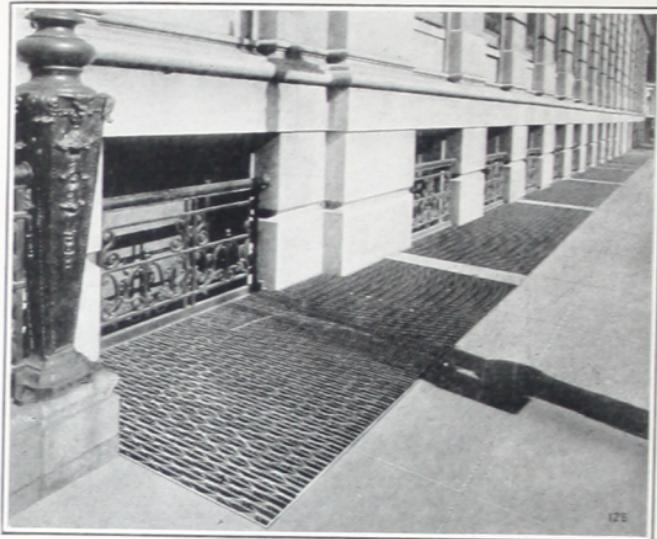
Car Safstep No. 2—Specifications

STRAIGHT BARS			$\frac{1}{4} \times \frac{1}{8}$	Type K Flooring
RETICULINE BARS	$\frac{1}{2} \times \frac{1}{8}$			
WIDTH	LENGTH		DISTANCE "A"	
$5\frac{5}{8}$	2'-5 $\frac{1}{2}$ "	3'-0 $\frac{1}{2}$ "	$2\frac{1}{2}"$	
$8\frac{1}{4}$	2'-5 $\frac{1}{2}$ "	3'-0 $\frac{1}{2}$ "	$4\frac{1}{2}"$	
$10\frac{1}{8}$	2'-5 $\frac{1}{2}$ "	3'-0 $\frac{1}{2}$ "	7"	

Car Safstep No. 3—Specifications

STRAIGHT BARS			$1\frac{1}{4} \times \frac{3}{8}$	Type K Flooring
RETICULINE BARS	$\frac{1}{2} \times \frac{1}{8}$			
WIDTH	LENGTH		DISTANCE "A"	
$5\frac{5}{8}$	3'-7 $\frac{1}{2}$ "	3'-11"	4'-6"	$2\frac{1}{2}"$
$8\frac{1}{6}$	3'-7 $\frac{1}{2}$ "	3'-11"	4'-6"	$4\frac{1}{2}"$
$11\frac{1}{8}$	3'-7 $\frac{1}{2}$ "	3'-11"	4'-6"	7"

Irving Iron Works Co., Long Island City, N. Y.



125

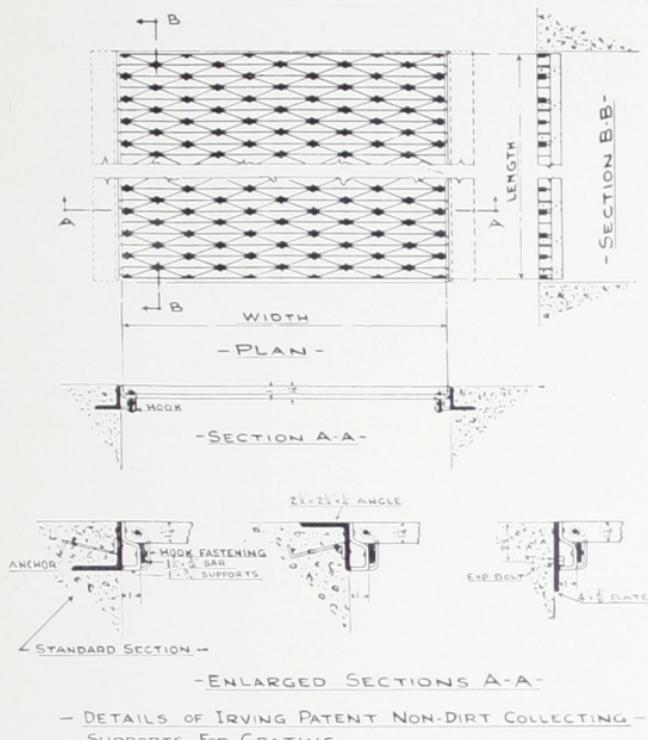
Irving Subway area covers beside National City Building, 42nd Street, New York City: architecturally and mechanically right.

**IRVING SUBWAY AREA COVERS
FOR SIDEWALK GRATINGS, LIGHTING
AREAS, ETC.**

Nothing meets the demands of this service so well as **Irving Subway**. While affording 80% opening for light and air, it is as smooth and comfortable to walk or work upon as a solid floor. The individual openings in it are so small, and so shaped, that even French heels cannot get caught; nor can baby carriage wheels go through.

It gives a surface that is permanently non-slipping under all conditions. See the example pictured on page 10. And it does not readily fill up with dirt. As to its durability—thousands of square feet of **Irving Subway** on the busiest streets of New York under the heaviest foot traffic and exposure to the elements, show no appreciable wear—are still non-slipping—after years of service. There is no looseness and no rattling.

Irving Iron Works Co., Long Island City, N. Y.

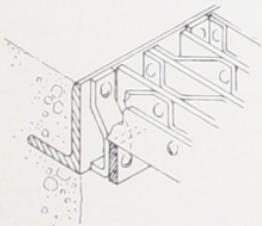


— DETAILS OF IRVING PATENT NON-DIRT COLLECTING —
— SUPPORTS FOR GRATING —

Standard Sizes—Irving "Subway Area Covers

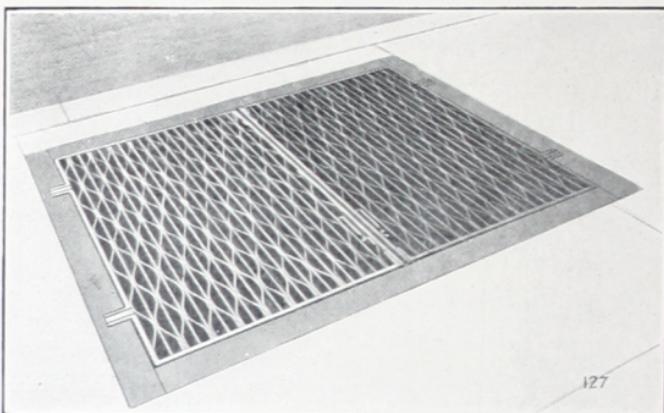
SIZE NO.	1	2	3	4	5	6	7	8	9	10
WIDTH	2' 0"	2' 0"	2' 0"	3' 0"	3' 0"	3' 0"	4' 0"	4' 0"	4' 0"	4' 0"
LENGTH	3' 0"	4' 0"	6' 0"	3' 0"	4' 0"	6' 0"	4' 0"	8' 0"	12' 0"	16' 0"

Standard section always furnished unless otherwise specified.



The Irving Patent-ed Non-Dirt-Collecting Support for area covers, here sketched, is a distinct improvement in under-foot construction. Absolute

strength and rigidity are assured, yet there are no ledges to catch and hold dirt in unsightly masses. There can be no looseness, no sagging, no depressions—the grating is held firm and flush.



Sidewalk doors of **Irving Subway**, 42nd Street, New York: note the absolutely flush surface and finished appearance.

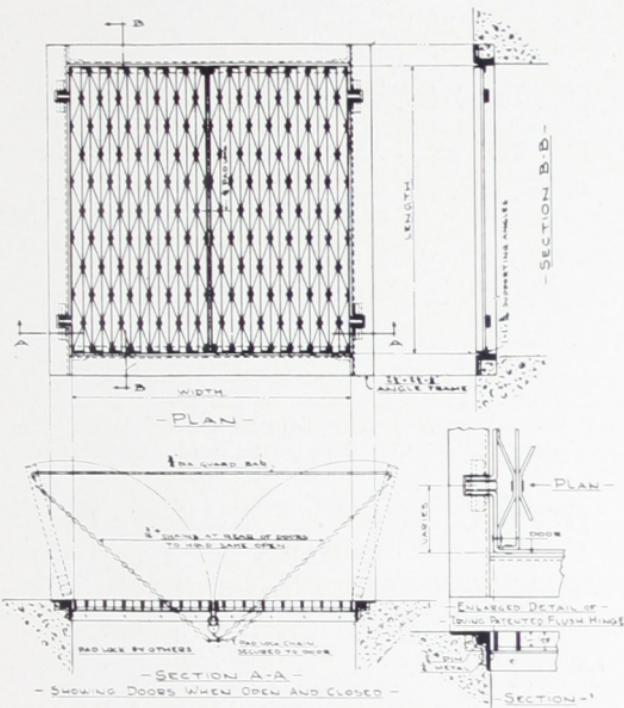
IRVING SUBWAY SIDEWALK DOORS

FOR AREAS, HATCHWAYS, ASH HOISTS, ETC.

These provide a high-class article to take the place of the makeshift construction so often used. Standard **Irving Subway** is used, and the units can be made in any size or shape desired. When installed according to **Irving** instructions, nothing whatever protrudes above the sidewalk surface, for people to stumble over. And no kind of weather can make the surface slippery. They can be used in front of show windows without any danger of frightening away the passing traffic—they're comfortable to walk on or stand upon.

They are sold preferably in complete units, including panels, hinges and frames. Standard sizes are listed on the opposite page. As mounted with **Irving** patented flush hinges with special frame, they form a permanent structure flush with the sidewalk surface and with practically no ledges to catch dirt.

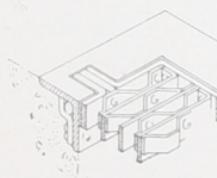
Irving Iron Works Co., Long Island City, N. Y.



Standard Sizes—Irving Subway Sidewalk Doors

SIZE NO.....	1	2	3	4	5
LENGTH AND WIDTH	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"

Furnished complete with **Irving Subway Type "G" 1 1/4"** depth, with frames, anchors, hasp, chain and guard bars.



The Irving Patented Flush Hinge, shown in the sketch herewith, gives a finished appearance, an absolutely flush surface, and a strong, durable construction. There's nothing projecting, to trip over. The drawing shows how the grating is riveted to a surrounding steel frame, making each door a solid unit.

IRVING SUBWAY REGISTERS

FOR PIPELESS AND HOT-AIR FURNACES

This is a logical development of **Irving Subway** metallic flooring with unique advantages in this service. As compared with the usual cast iron register, the **Irving Subway Register** is lighter in weight and at the same time has the strength to resist a pressure or shock that would break any cast iron form. It can be shipped and handled without danger of breakage or distortion and can be installed with the minimum of labor.

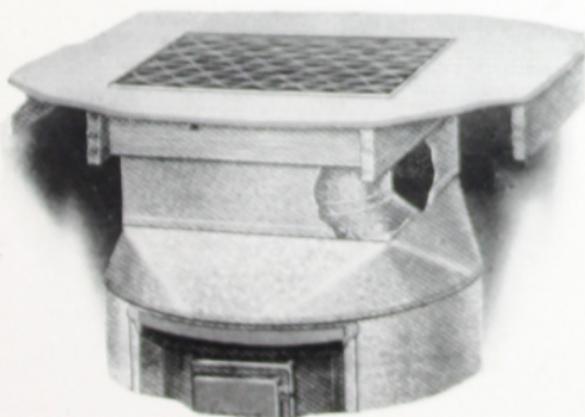
The opening for passage of air is 80% of the total area—a fact making for higher furnace efficiency as the flow of hot air is practically unimpeded. The surface exposed for walking upon is smooth and non-slipping, and ornamental in appearance. The size of mesh is a matter of choice, and the size and shape can be as desired—an angle-iron frame surrounding the panel. Where necessary, a pipe collar or ring for attaching to the warm air outlet can be furnished.

Prices will be quoted upon receipt of dimensions and general information as to the service to be met.

Irving Iron Works Co., Long Island City, N. Y.



Typical Irving Subway Register—light, strong, ornamental, efficient.



A pipeless furnace equipped with an **Irving Subway Register**.

IRVING SUBWAY CONCRETE SURFACE ARMORING

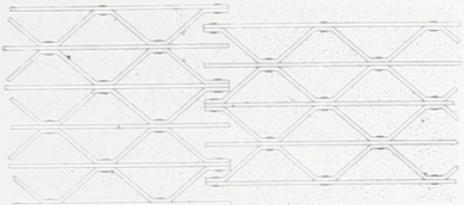
FOR CONCRETE FLOORS, LOADING PLATFORMS,
STAIRS, ETC.

In this application, panels of **Irving Subway** of suitable depth are laid over the area to be armored, before the topping is applied. Then the topping is poured over the grating and trowelled flush with the edges of the steel and with the surrounding area. The result is a smooth concrete floor armored at points of greatest wear with steel bars.

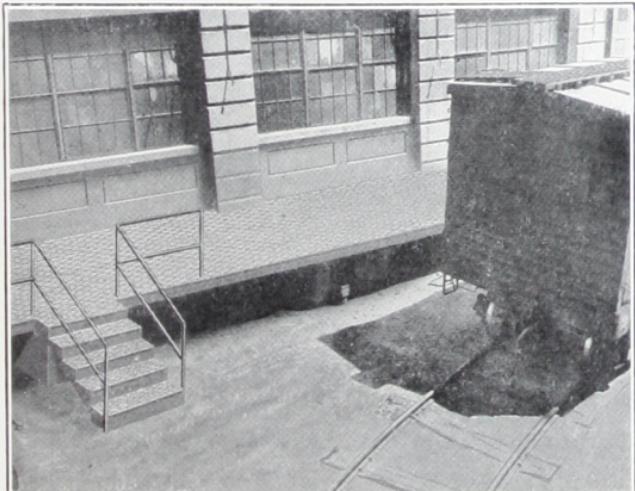
The place for **Irving Subway Armor-ing** is on loading platforms in factories and warehouses, in foundries and mills where heavy castings and ladles are handled, in freight yards and express stations, on wharfs and docks, in milk depots, in paper mills—wherever heavy trucks may be rolled, or barrels, boxes, cans, etc., dropped. Here it adds immeasurably to the life of the concrete surface, by taking the shocks which would otherwise shatter the topping and make unsightly repair patches necessary. Furthermore, it makes the surface non-slipping and more comfortable.

Stair steps and landings may be treated in the same way to advantage. An open stairway using **Safsteps** may have the **Safsteps** poured full of concrete left flush with the surface of the steel bars, making solid steps of exceptional strength —fire-proof and practically time-proof.

Irving Iron Works Co., Long Island City, N. Y.



Some construction details of concrete armoring with **Irving Subway**.



Irving Subway concrete armoring lengthens the life of loading platforms in such service as this.

Irving Iron Works Co., Long Island City, N. Y.



A fire-proof, ventilating floor of **Irving Subway** in a pattern storage room.

IRVING SUBWAY

FOR STORAGE, STACK AND STOCK ROOMS

Irving Subway in conjunction with storage racks, book stacks, parcel checking rooms, pattern storage, etc., offers advantages afforded by no other flooring. It is 80% open space, allowing almost unrestricted passage of light through a floor as smooth as the best solid floor. Its extremely light weight makes possible lighter and less costly supports. It is clean and sanitary, affording no lodgement for dust and dirt. It is fire-proof, depreciation-proof, rigid and non-warping. It permits free circulation of air where this is most desirable.

Irving Iron Works Co., Long Island City, N. Y.

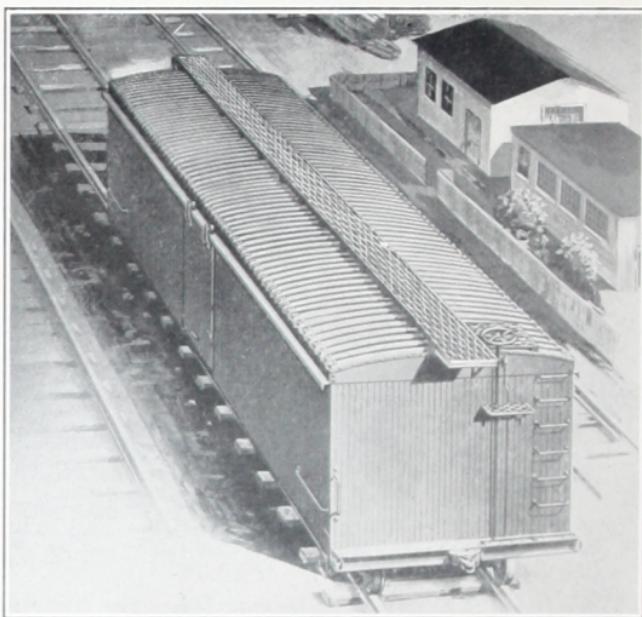
In many cases — where lightness, strength and the utmost in ventilation are sought—**Irving Subway** makes a splendid shelving material. Made in units of convenient size and shape, it is easily built up or extended or rearranged, and can be assembled with the minimum of trouble in stacks of any size, width or capacity.

Correspondence is invited with manufacturers of metallic stacks, racks, shelving and bins—and quotations will be made based upon the most economical use of standard-sized **Irving Subway** units for the loads and spans specified.



These stock-room mezzanine floors of **Irving Subway** assure cleanliness, ventilation and comfort.

Irving Iron Works Co., Long Island City, N. Y.



Irving Subway as a freight-car runway, and brake steps of **Irving Safstep**, mean safety and serviceability.

IRVING SUBWAY

FOR RAILWAY SERVICE

In this vast field, **Irving Subway** offers preeminent advantages for many purposes. Its adoption is directly in line with the slogan "Safety First" which is reducing railway casualties year after year.

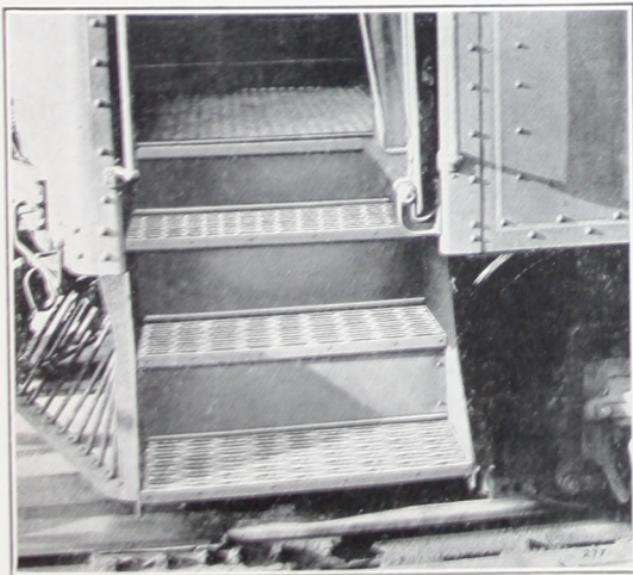
On rolling stock and motive power, logical uses for **Irving Subway** are for runways on freight cars, tank cars and locomotives, for brake steps on freight cars, and for steps on passenger coaches, cabooses and locomotives. Its adoption as runway and brake steps will realize the long-sought ideal of an all-steel, fire-proof freight car.

Irving Iron Works Co., Long Island City, N. Y.

In all such out-door exposures as these, the permanently non-slipping surface of **Irving Subway** stands out as a preeminent merit—a surface which oil, grease or water will not make slippery and which snow and ice affect less than any other surface.

In the railway shop, power plant and sub-station, passenger station, freight terminal and dock, **Irving Subway** offers all the advantages and economies explained earlier in these pages—as a flooring, walkway, area cover, concrete armoring, etc.

As a factor of proved value in operating safety, economy, and efficiency, **Irving Subway** will be found in increasing quantities in railway service, as railway standards advance and the necessity for speed with safety and reliability becomes ever more pressing.



Irving Car Safsteps help maintain safety and quick service on the traction line using these cars.

Irving Iron Works Co., Long Island City, N. Y.

IRVING "RETICULINE" RADIATOR GUARD

FOR MOTOR TRUCKS AND MOTOR BUSES

Approved by The Underwriters' Laboratories

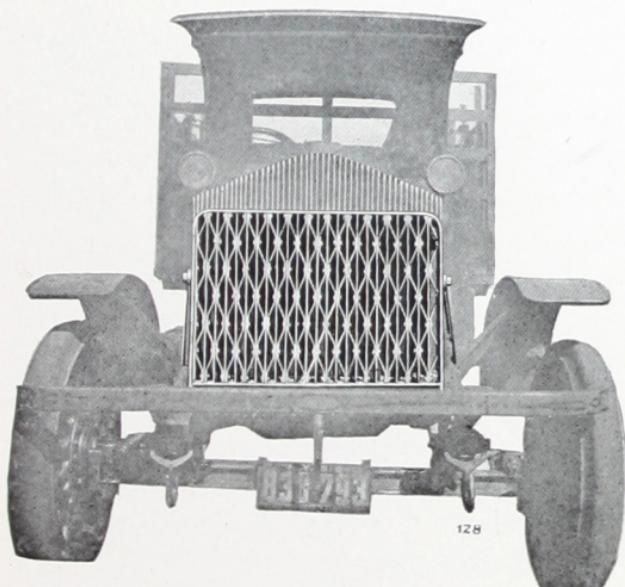
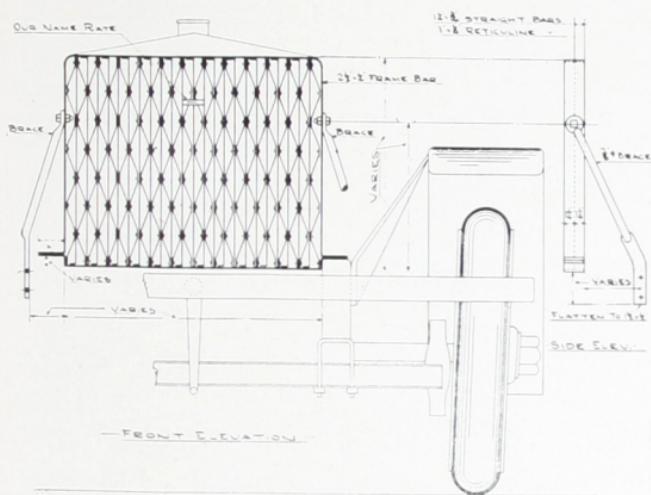
A shock-absorbing, impact-resisting barrier of steel bars between the radiator and sources of injury—that's what the **Irving "Reticuline" Radiator Guard** is.

It consists of a panel of **Irving Subway** mounted in a steel frame and rigidly secured to the chassis. The truss-like arrangement of alternate straight and "Reticuline" bars, distributes a blow or pressure over the whole panel and takes up the impact in a spring-like deflection and reaction instead of in a permanent distortion or collapse. There's all the protection a solid steel plate could give, with an 80% opening for air circulation and a big saving in weight. It is neat and inconspicuous, detracting nothing from the appearance of the finest equipment.

Nothing will put a truck or bus out of commission more completely, than a damaged radiator—and an idle transportation unit earns no profits for its owner nor credit for its builder. An **Irving "Reticuline" Radiator Guard** is simply the best kind of business insurance for truck or bus owner and builder.

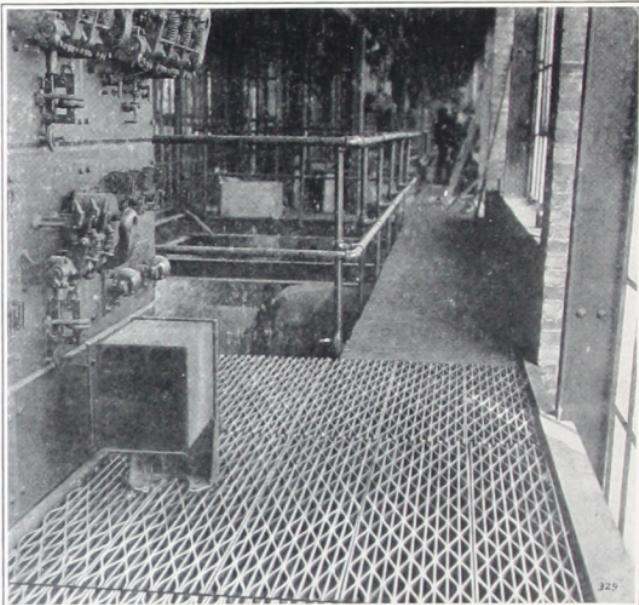
Details are shown on the opposite page. Standard sizes fit all 1, 1½, 2, 2½, 3, 3½, 5 and 7-ton trucks. Prices on application.

Irving Iron Works Co., Long Island City, N.Y.

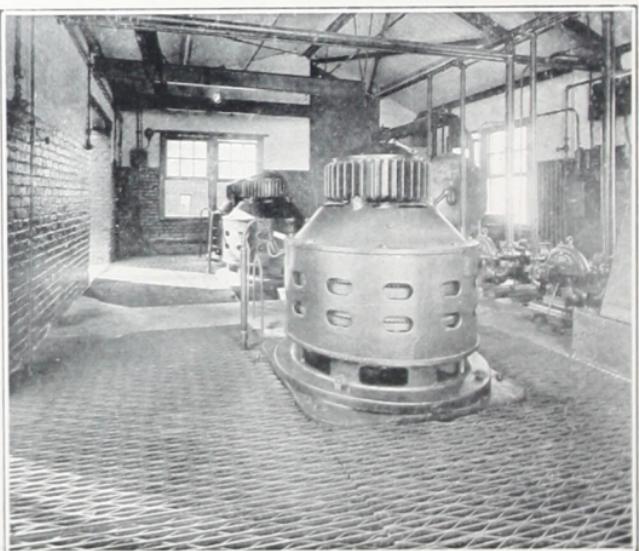


Irving "Reticuline" Radiator Guard as applied to a
Pierce-Arrow motor truck.

Irving Iron Works Co., Long Island City, N. Y.



A safe, cool floor of **Irving Subway** in front of a switch-board.



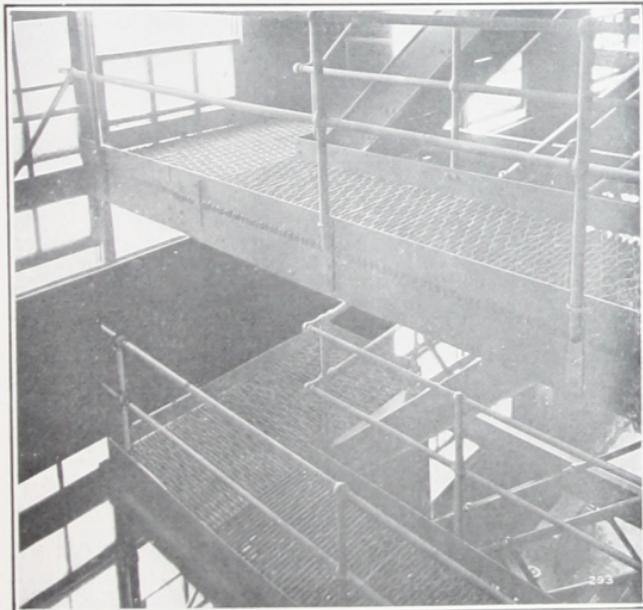
No dark, stuffy spaces beneath this power plant floor of **Irving Subway**; men work upon it and beneath it, in safety and comfort.

Irving Iron Works Co., Long Island City, N.Y.

LABORATORY TESTS OF IRVING SUBWAY

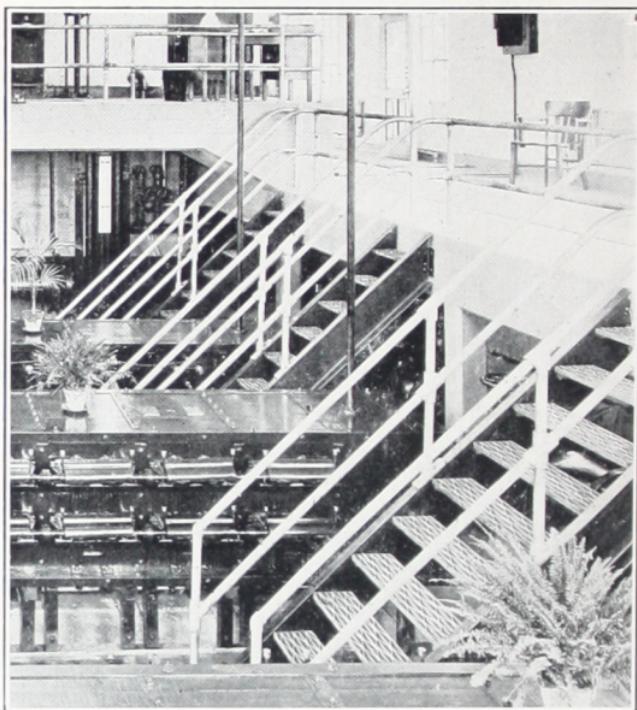
The Physical Laboratories of Rensselaer Polytechnic Institute, Troy, N. Y., were commissioned to make scientific tests to demonstrate the exact physical strength of **Irving Subway**. On pages 66 and 67 following, the result of two tests are graphically shown—the figures proving conclusively that the safe load ratings given in the table on pages 40-41 allow a factor of safety which can be exceeded only under the most extraordinary conditions of loading.

The illustration inset on page 67 shows a panel used in another test. It demonstrates clearly how a load concentrated



An example of modern safety engineering—stair landings of **Irving Subway**, stairs of **Irving Safsteps**.

Irving Iron Works Co., Long Island City, N. Y.



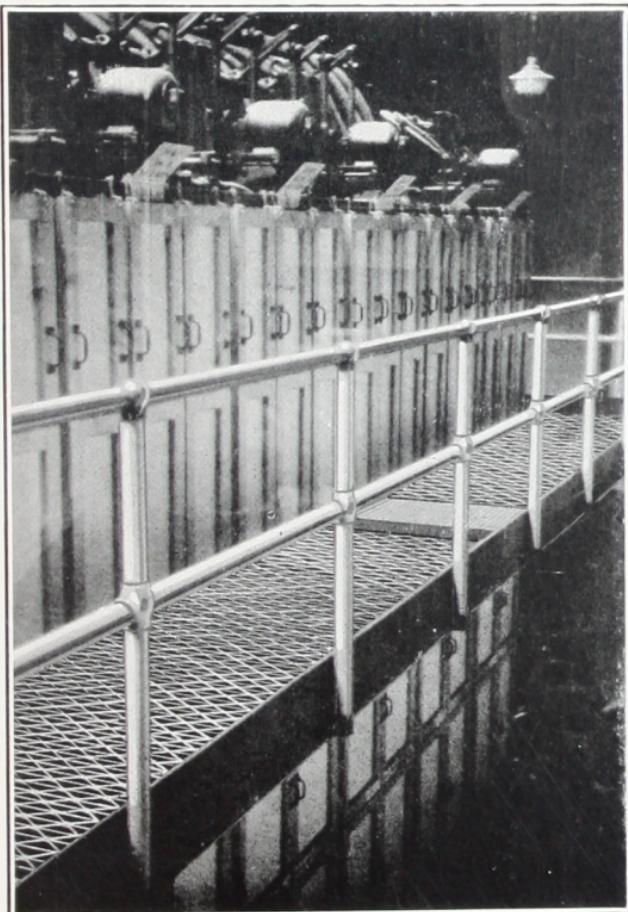
Safety assured in this sewage disposal plant by stairways of **Irving Safsteps**.

at one point—as indicated by the arrow—is distributed over the adjacent area by the truss action of the “Reticuline” bars. No other type of grating or grating-flooring has this load-distributing feature.

In straight bar grating and in any form of grating except **Irving Subway**, the design precludes the figuring of any single bar as a beam with the usual allowable fiber stress for steel. Any single member in such grating structures will fail by overturning or twisting or buckling, long before the strength of the material is developed.

Irving Iron Works Co., Long Island City, N. Y.

In **Irving Subway**, on the contrary, the "Reticuline" bars truss or brace the straight bars and prevent any buckling or twisting of the members until the full strength of each individual bar, as a beam, has been developed. This is an exclusive and patented feature of **Irving Subway** explaining its unequaled strength per unit of weight and span.



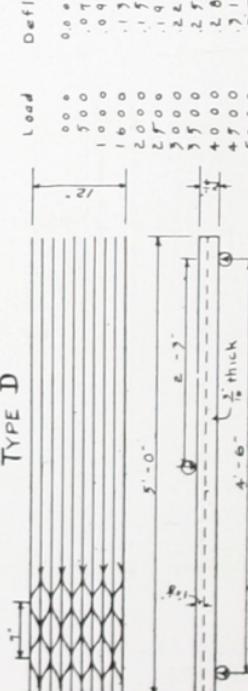
Note how well lighted is the space beneath this switchboard gallery of **Irving Subway**.

SPECIAL TEST REPORT.

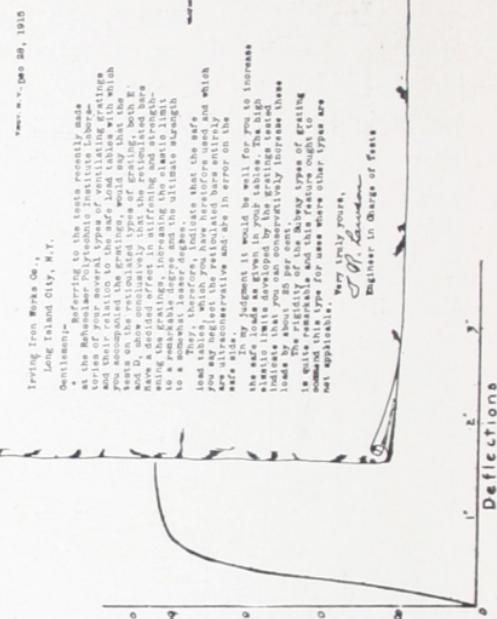
To Irving Iron Works Co.,
New York
Material Downing Grating submitted by
J. A. D. "D" type
Irving Iron Works Co.

Nov. 5—1915

E. B. Fox
ENGINEER IN CHARGE OF TESTS.



TYPE D	Load	Defl.
	0.00	0.00
	.21	.21
	500	.071
	1,000	.094
	1,600	.120
	2,000	.152
	2,700	.192
	3,000	.225
	3,500	.252
	4,000	.289
	4,700	.319
	5,000	.352
	5,500	.382
	5,800	.406
	6,000	.427
	6,500	.460
	7,000	.494
	7,500	.522
	8,000	.540
	8,500	.562
	8,700	.582
	9,000	.600



Long Island City, N. Y.
December—
Referring to the tests recently made

at the Rensselaer Polytechnic Institute of your several types of metal gratings and their relation to the safe loads taken with which you accompanied the gratings, would say that the tests you have conducted are of great value. Both E and D show somewhat similar types of grating, both E having a decided effect in stiffening and strengthening the gratings, increasing the elastic limit to a somewhat greater degree than the ultimate strength. They, therefore, indicate that the safe load tables, which you have heretofore used and which have been used by the particular manufacturers of these gratings, are in error on the safe side.

In my judgment it would be well for you to increase

the safe load as given in your tables. The high

elastic limit of the metal gratings tested

indicates that you can considerably increase these

loads by about 50 per cent.

In view of the fact that the Bowey types of grating

and the metal gratings tested are of the same

material and the types of safe loads ought to

not be greatly different, it would be well to increase

the safe load for the Bowey types of grating

as well as for the metal gratings tested.

Very truly yours,
E. B. Fox
Engineer in Charge of Tests

Irving Iron Works Co., Long Island City, N. Y.

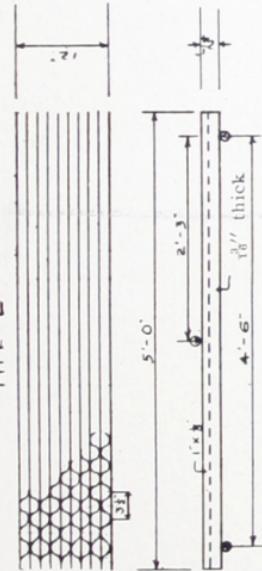
No. 189-A

TESTING LABORATORIES OF THE RENSSELAER POLYTECHNIC INSTITUTE, TROY, N. Y.

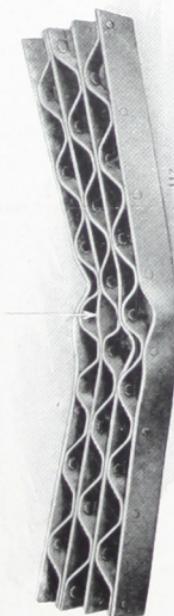
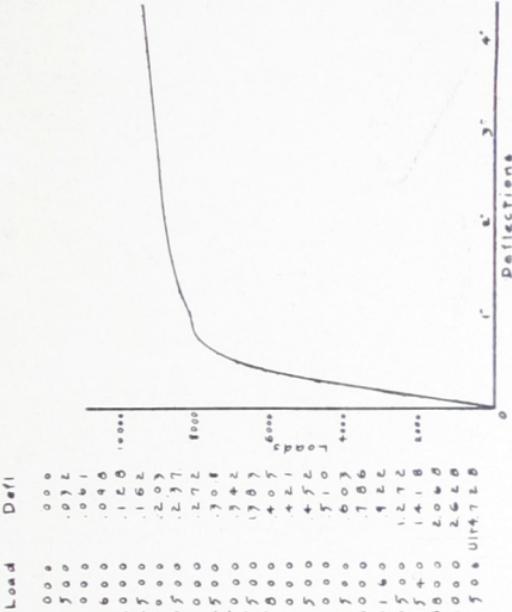
SPECIAL TEST REPORT.

For Irving Iron Works Co., Troy, N. Y.
 Material Ironning Barbary Plating Submitted by Irving Iron Works Co.,

Nov. 13, 1915
Emmett F. Fox
 ENGINEER IN CHARGE OF TESTS.

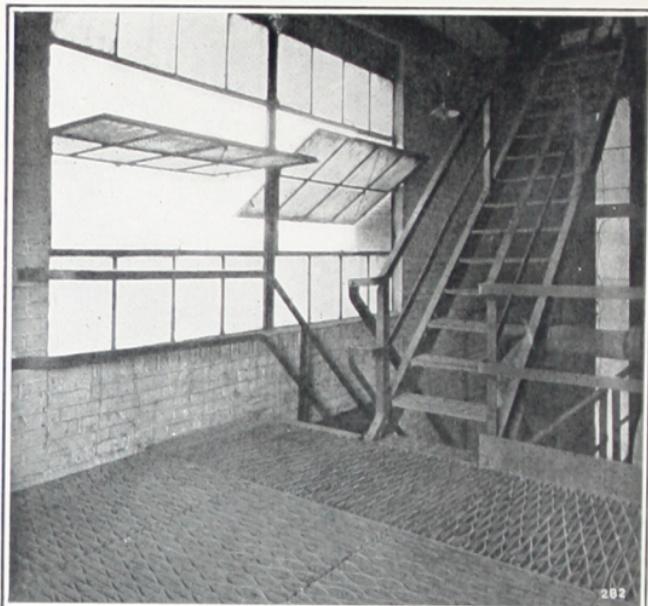
TYPE E

Type	Load	Defl.
	0.0	0.0
	5.0	.072
	10.0	.061
	15.0	.046
	20.0	.120
	25.0	.162
	30.0	.203
	35.0	.237
	40.0	.272
	45.0	.308
	50.0	.342
	55.0	.383
	60.0	.425
	65.0	.467
	70.0	.509
	75.0	.549
	80.0	.586
	85.0	.622
	90.0	.656
	95.0	.687



112

Irving Iron Works Co., Long Island City, N. Y.



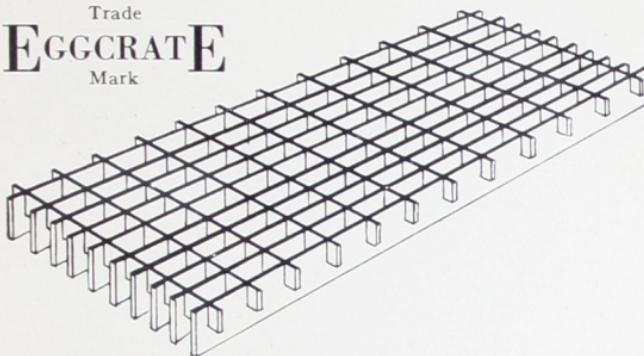
Another example of industrial safety and efficiency—
floors of **Irving Subway**, stairs of **Irving Safsteps**.



Installation of **Irving Walkway** and **Irving Safsteps**
on U. S. battleship "Tennessee."

Irving Iron Works Co., Long Island City, N. Y.

Trade
EGGCRATE
Mark

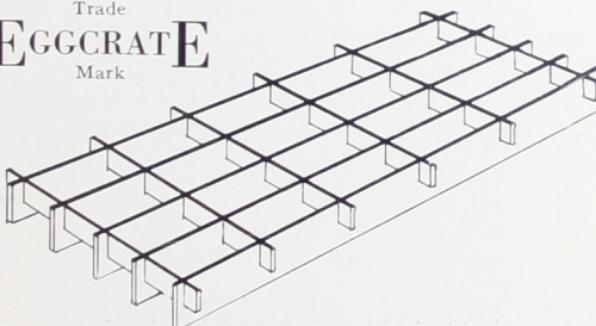


IRVING EGGCRATE

TYPE "H"

This is an excellent grating for use as a screen for pump intake wells, trash stops at dams, or for other purposes where a rectangular mesh is desired. It is not, however, recommended for use as a flooring—for it is not comfortable and non-slipping under foot, as is **Irving Subway**. For a given load and span, it must be of heavier material than any of the **Subway** types—because the truss element is lacking and the straight bars, not braced at the top chord, are liable to buckle or overturn. It should always be placed in a frame, to prevent racking out of shape. Made in all widths and in varying depths for various loads and spans.

Trade
EGGCRATE
Mark



IRVING EGGCRATE

TYPE "I"

This differs from Type "H" in having the transverse members twice as far apart, and is therefore a weaker construction not adapted for use as a flooring or for any other purpose where any load must be carried. It is practically a straight bar grating, with all the disadvantages that implies. In fact, it is suitable only for use as a screen.

Irving Iron Works Co., Long Island City, N. Y.

Trade
S U B W A Y
Mark

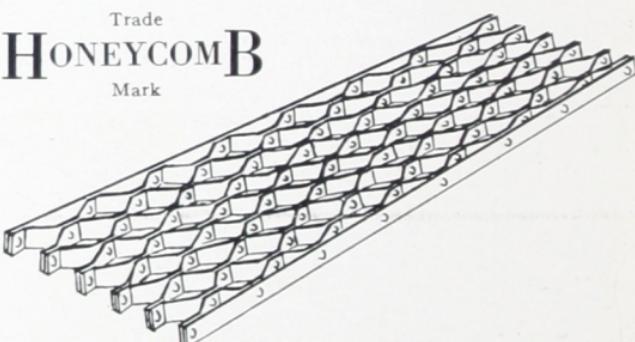


IRVING SUBWAY

TYPE "D"

This is one of several special **Subway** types, differing from the standard **Types "G" and "E"** in the shape of the "Reticuline" bar. In the vast majority of cases, the standard **Subway** types are to be preferred.

Trade
HONEYCOMB
Mark



IRVING HONEYCOMB

TYPE "F"

This is a fairly attractive, but expensive, grating. It has been used in a number of cases where "individuality" rather than maximum value seemed to be the predominating factor in choice. Like the **Eggcrate** type, it looks much better in the illustration than in the field, where the absence of the truss element is more noticeable. It is made in all widths and in varying depths—but is not recommended for heavy loads or long spans.

Irving Iron Works Co., Long Island City, N. Y.

Trade
S U B W A Y
Mark

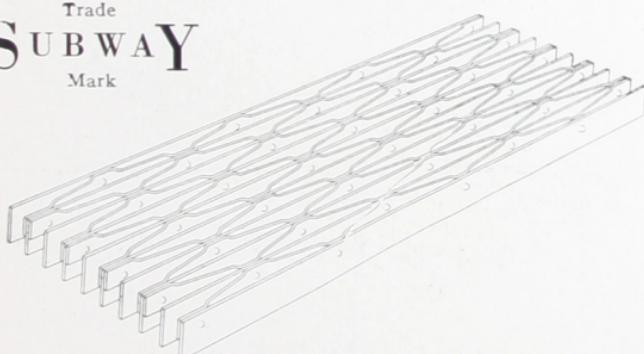


IRVING SUBWAY

TYPE "L"

This is another special **Subway** type, with a much wider "mesh" than the standard, and has found application for a number of special purposes.

Trade
S U B W A Y
Mark



IRVING SUBWAY

TYPE "M"

This differs from the standard **Subway** types in the shape of the "crimp" given the "Reticuline" bar. While considered by some to be rather more "ornamental" than Type "G" or "E," this is probably the only advantage it offers over the standard.

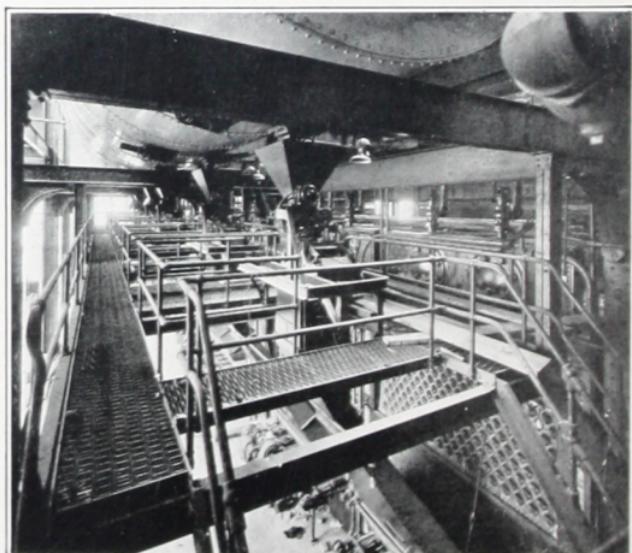
SPECIFICATIONS

The following form of specification is prepared for the use of engineers and architects wishing to designate definitely, by name, without possibility of substitution, **Irving Subway** for their work.

Type "G" Irving Subway as made by the Irving Iron Works Company, Long Island City, N. Y., to support . . . lbs. per square foot on a . . . foot span without failure or permanent deformation.

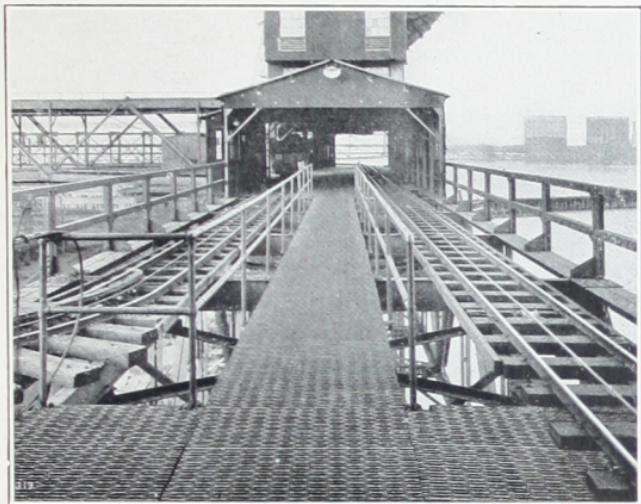
Type "E" Irving Subway as made by the Irving Iron Works Company, Long Island City, N. Y., to support . . . lbs. per square foot on a . . . foot span without failure or permanent deformation.

Where it is desired to specify **Irving Subway** and to secure its exclusive advantages, but where circumstances forbid the use of the name, the following form of



These **Irving Walkways** do not in any way interfere with the lighting and ventilation of this boiler room.

Irving Iron Works Co., Long Island City, N. Y.



Irving Subway is an important part of this public service station coal storage.

specification can be used without possibility of substitution.

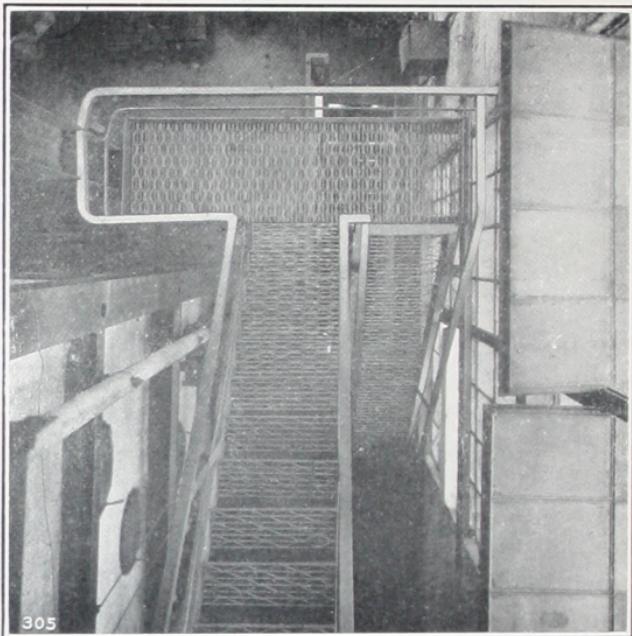
Type "G"

A "reticuline" grating-flooring to support . . . lbs. per square foot on a . . . foot span without failure or permanent deformation. Mesh shall not be larger than 3 $\frac{1}{4}$ sq. inches in area nor longer in one direction than 3 $\frac{1}{2}$ " mean, nor wider than 1"; and shall be secured at intersections by either riveting or welding. The crimped or "reticuline" bars shall be of less depth than the straight bars to insure more cleanliness and light. All bars shall be set with their top surfaces flush.

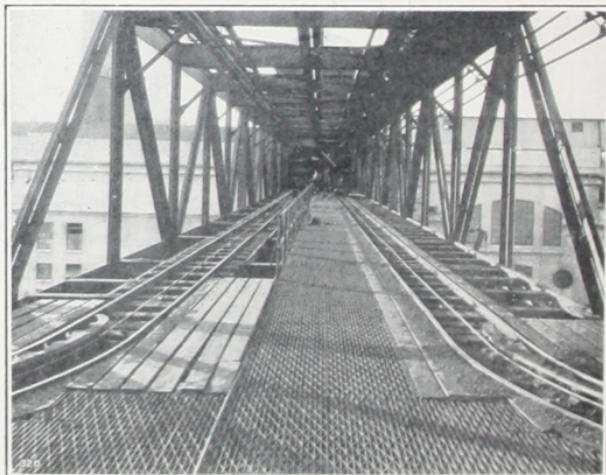
Type "E"

A "reticuline" grating-flooring to support . . . lbs. per square foot on a . . . foot span without failure or permanent deformation. Mesh shall not be larger than 1 $\frac{1}{2}$ sq. inches in area nor longer in one direction than 1 $\frac{1}{2}$ " mean, nor wider than 1"; and shall be secured at intersections by either riveting or welding. The crimped or "reticuline" bars shall be of less depth than the straight bars to insure more cleanliness and light. All bars shall be set with their top surfaces flush.

Irving Iron Works Co., Long Island City, N. Y.

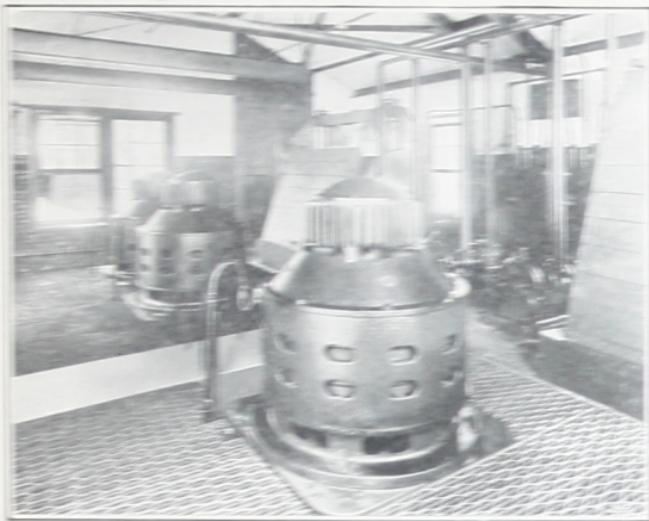


Looking down on a stairway of **Irving Safsteps** with landings of **Irving Subway**—safety under all conditions.



This power plant walkway of **Irving Subway** is safe and comfortable under all weather conditions.

Irving Iron Works Co., Long Island City, N. Y.



Thousands of square feet of Irving Subway are used as open, ventilating flooring in this up-to-the-minute power plant—most of it on "repeat orders."

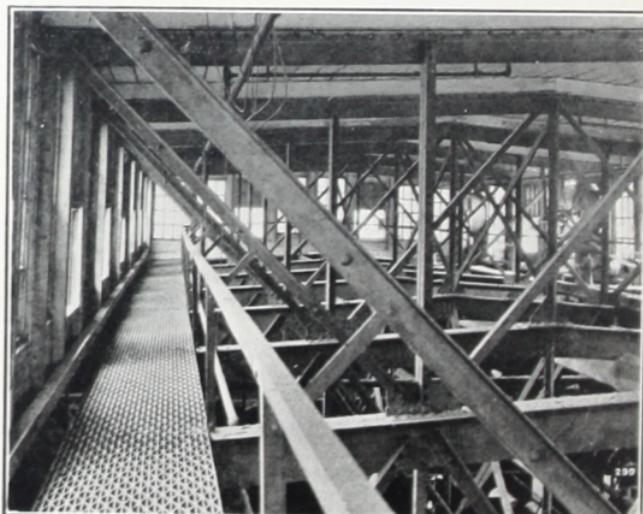


Gallery or walkway of Irving Subway in one of the biggest chemical plants in the country.

Irving Iron Works Co., Long Island City, N. Y.

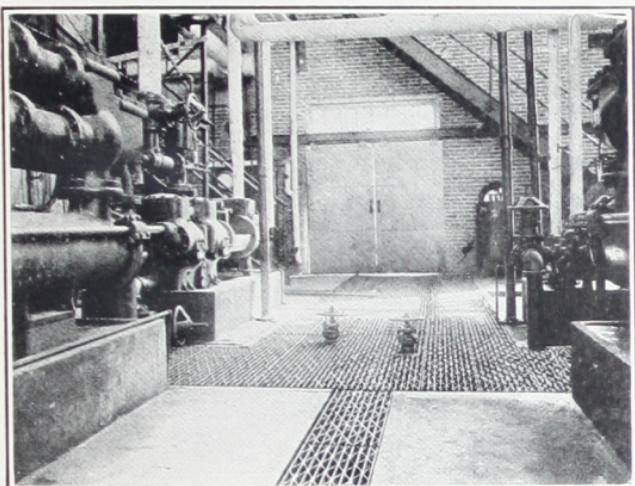


A fire-proof stairway of **Irving Safstep**, filled in with concrete to make solid steps.

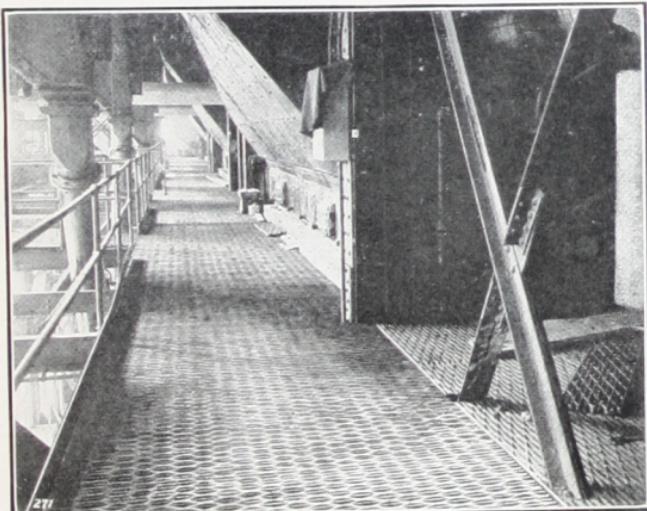


A light, safe, fire-proof gallery of **Irving Walkway**.

Irving Iron Works Co., Long Island City, N. Y.

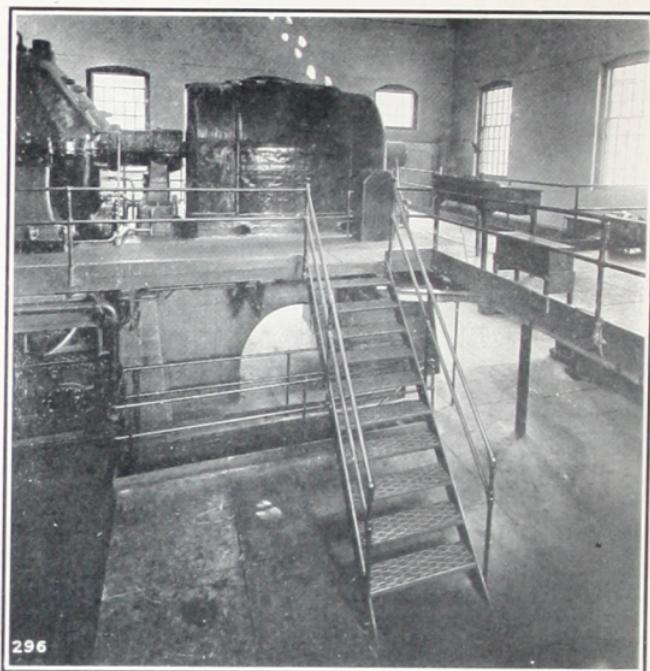


Irving Subway used over a pipe tunnel in an oil pumping station.



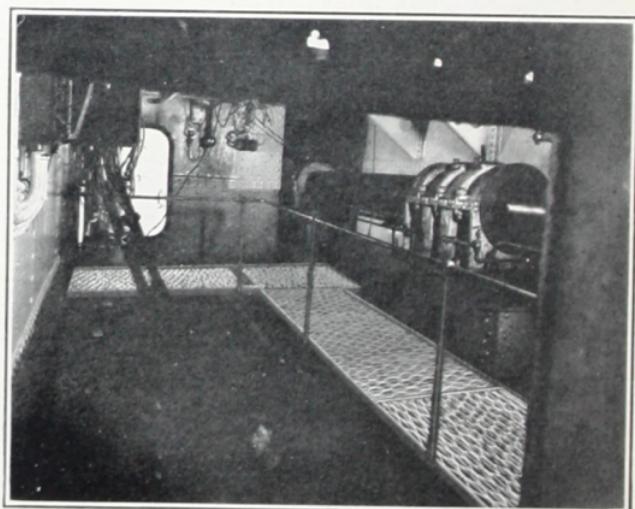
This **Irving Flooring** gives a comfortable footing in one of the country's big chemical plants.

Irving Iron Works Co., Long Island City, N. Y.



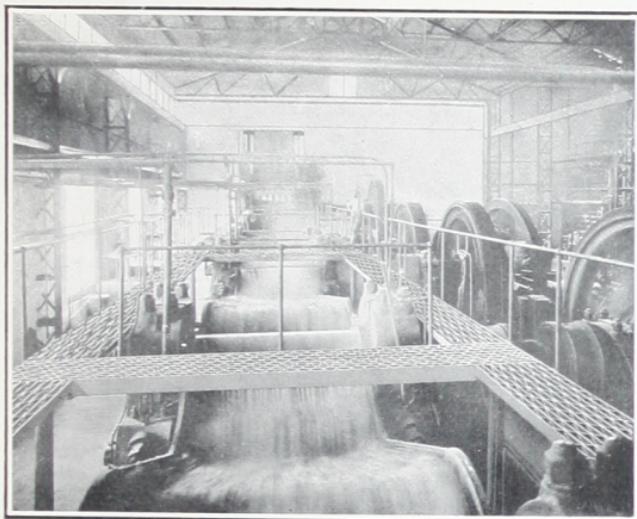
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This stairway of **Irving Safsteps** conforms in every way with the engineering refinements of this twentieth century power plant.

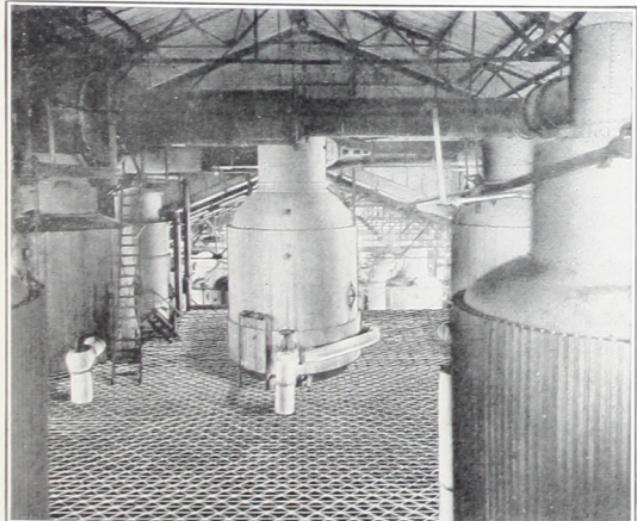


Irving Walkway beside one of the propeller shafts of U. S. S. "Tennessee."

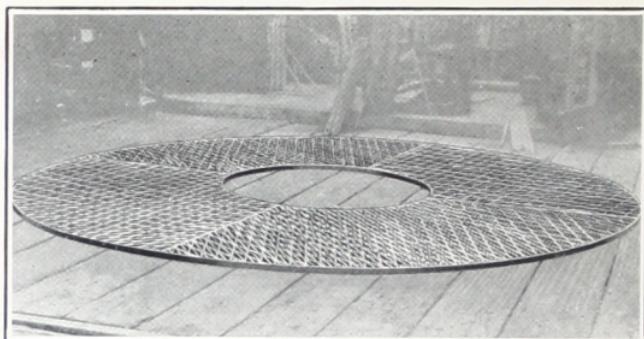
Irving Iron Works Co., Long Island City, N. Y.



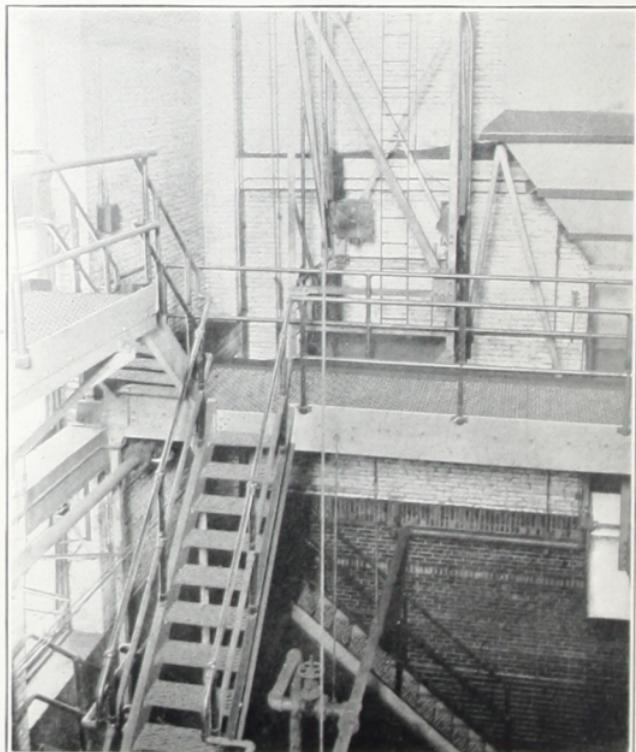
The advantages and economies of **Irving Subway** in sugar centrals and refineries, are exceptional. These two illustrations suggest its possibilities.



Irving Iron Works Co., Long Island City, N. Y.



Illustrating how readily **Irving Subway** can be "cut to fit" unusual and difficult spaces.



Over 26,000 sq. ft. of **Irving Subway** and 594 **Irving Safsteps** in this central station.

POSTSCRIPT

The use of **Irving Subway**—in engineering, industrial, architectural and marine construction—evidences progress toward better professional practice, marks higher ideals of economy and service, suggests the finest opportunity of proving to a client your ability to discover and adopt the most up-to-date improvements.

The unvarying success of **Irving Subway** in every application, confirms the judgment of those engineers and architects who have recommended and specified it.

No item of equipment is more readily seen, more easily comprehended, more generally useful, than **Irving Subway**.

Let its use on your work be evidence of your study, research and progressiveness.

IRVING SUBWAY TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y.: U.S.A.

IRVING SAFSTEP TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS